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ABSTRACT

Presenting highlights from a seminar designed to explore the possibilities of "developing minerals in Indian nations by Indian people for the benefit of Indian people", this document includes documentation of the proceedings as follows: (1) Participants Roundtable (participant experiences revealing concern for lack of knowledge, expertise, and power regarding mineral development, evaluation, and negotiation); (2) A Global View (discussion of copper in terms of world-wide availability, production, consumption, and trade); (3) The Papago Experience (copper mining royalties, economics, environmental problems, etc.); (4) A Regional View: The Case of Northern Wisconsin (passive vs active response strategies applicable to the influx of multinational corporations); (5) A Bureau of Indian Affairs View (the BIA's lack of funds, expertise, and self-interest); (6) Before You Develop: Measuring the Impacts (air and water quality, land use, quality of life, etc); (7) Dealing with Developers (royalties, joint venture arrangements, production sharing agreements, state taxation, etc.); (8) Developing Mining Policies (royalties vs service contracts, economic vs environmental concerns, etc); (9) Planning for Development (control, long-term strategies, financial and decentralized planning, etc.); (10) Tribal Powers and Taxation (Federal limitations on tribal sovereignty, theories invalidating state taxation, etc.). (JC)

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HARD CHOICES: DEVELOPMENT OF NON-ENERGY NON-REPLENISHABLE RESOURCES

ED141027

AIO REPORT

U.S. DEPARTMENT OF HEALTH,
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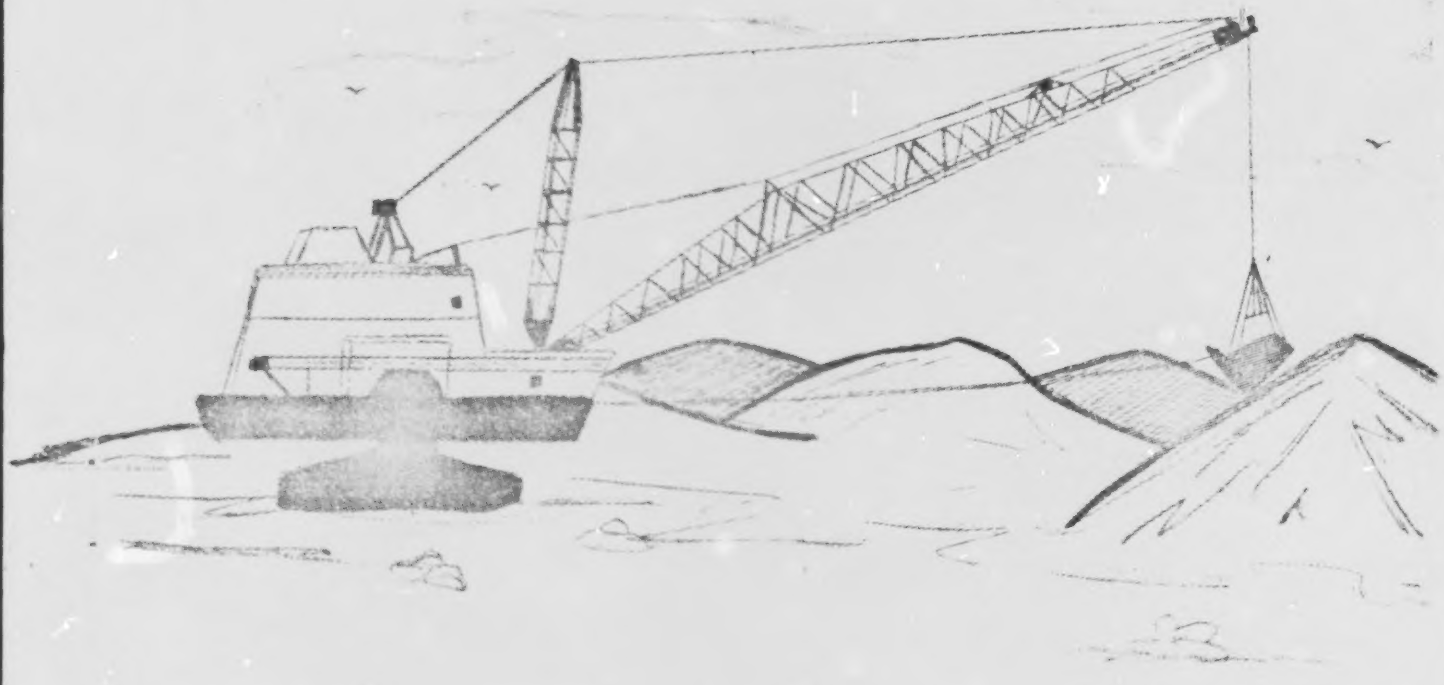

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AIO
SUITE 403
600 SECOND STREET, N.W.
ALBUQUERQUE NM 87102
Americans for Indian Opportunity

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The recent rush by mining companies to explore and develop on Indian lands has posed some hard questions for Indian decision-makers. Up until recently mineral development in Indian nations has amounted to exploitation. These valuable non-renewable resources have been exploited primarily for the benefit of non-Indian developers while Indian people have been left with nothing but a lease payment and the threatened destruction of Indian culture and environment. For that reason and by the request of the tribes, Americans for Indian Opportunity organized this seminar to draw some light on the possibility of developing minerals in Indian nations by Indian people for the benefit of Indian people.

LaDonna Harris
President
American for Indian Opportunity

Participants Roundtable

The purpose of the seminar was to specifically examine the problems and questions involved in the development of non-fuel minerals. We felt that it was necessary to separate the discussions of energy (fuel) minerals from hard rock (non-fuel) minerals since non-fuel minerals are subject to different kinds of economic conditions with greater fluctuation in price and demand. Additionally, energy tribes have already joined together for the purpose of sharing information and establishing policy through the Council of Energy Resource Tribes (CERT). Non-fuel tribes could also profit from such inter-tribal communications.

The first session "Participants Roundtable" involved participants Roundtable" involved participants discussing their particular situation and some of the problems they were having in acheiving fair and controllable development.

The tribes who were participating represented a variety of stages of development and experiences with non-fuel minerals. Several had reservations located in the areas of current heavy exploration in Northern Wisconsin (Bad River, Forest County Potawatomi, Lac Du Flambeau, Stockbridge-Munsee, Mole Lake, Red Cliff).

Others were Western Tribes who had not yet been involved in mineral development but who could be very soon (Colville, Walker River, Acoma Pueblo, Crow, Kaibab-Paiute).

Several tribes had no known mineral reserves but wished to be informed if the occasion came up (Ak-Chin, Santa Clara Pueblo, Eight Northern Indian Pueblos).

Only the Papago tribe had been involved in mineral extraction of any consequences.

The Lac Du Flambeau Chippewa tribe was approached by Phelps Dodge, a major multinational mineral corporation (they are now involved in uranium development on the Spokane Reservation) in November of 1975. According to tribal planner Gary Lapp, "A mining company man from Duluth came down to our tribal council with a lease in hand and said to the council, "I'm not in any particular hurry but I'd like to start drilling by Christmas." The mining company had already been doing preliminary exploration of the reservation, without the tribe's knowledge, with low flying airplanes. The information they had collected on the geology of the area and the data which turned up from the aerial photography had indicated that there was a possibility of copper-nickel reserves. The company now desired to do ground exploration. The lease that the company had prepared for the tribe to sign combined the exploration permit with the actual mining leases without any provision for changes in the lease if the orebody turned out to be quite valuable. This is common practice for public and Indian lands and a situation which almost never occurs in developing nations overseas.

The contract Phelps Dodge offered indicated: the company would pay for rental $1.00 an acre and a bonus equal to $2.00 per acre for exploration. This offer was much lower than the offers made by Kennecott and Noranda to other landowners. Exxon had been offering landowners $5.00 through $20.00 an acre for exploration.

The tribe would have had to be responsible for 10% of the cost incurred in exploration - cost ranging from $500,000 to $2,500,000.

The tribe had retained mining negotiator, Charles Lipton, to represent them in negotiations with the company. Lipton found that the Phelps Dodge offer was "one of the worst I've ever seen. It could result in the tribe putting up as much as one million dollars of their own funds with no controls over how the money would be spent and with little prospect of getting it back." The tribe turned down the offer and Phelps Dodge walked out and has not come back.

The 2,000 acre Mole Lake Chippewa Reservation lies a few yards away from Exxon's spectacular Crandan Copper-Nickel-Zinc find. Exxon had been buying land up all over the area before they approached the tribe. By the time they did the tribe had a pretty good idea of the value of the rich mineral lands. One 20 acre parcel near the reservation had been sold for 3 million dollars. "An Exxon representative," according to Community Development Planner John Schmitz," had showed up with a check for $20,251 for mineral prospecting and should an orebody be mined the tribe would be offered a sliding royalty of 5% - 13% (the minimum by law is 10%). The Exxon man said, "you sign this here lease and we'll sign this check." The tribe found that the proposed lease offered little in the way of profit, no tribal control, and possible devestation of the environment. The tribe rejected the agreement.

Tribal Chairman Charles McGeshick stated earlier in an interview that the tribe intends to do its own exploration to determine the value of the mineral and the feasibility of mining. If a deposit is discovered, the tribe would then issue a report to mining companies asking them to submit bids. One of the tribe's chief concerns would be the affect of mining on their sensitive wild rice operation. Planner Schmitz expressed that the tribes present concern is that even if the tribe doesn't go into mining, if the surrounding area does, the tribe could end up paying all the costs of detoriorated air and water, damaged timber and agriculture while gaining none of the benefits of development.

The Colville Tribe of Western Washington is currently negotiating with Kennecott Copper over a very large copper find. On another part of the reservation Hanna Mining is believed to have struck another large copper orebody. Colville Councilman Ernie Clark explained, "apparently Kennecott has located a large deposit of copper, approximately a half a billion tons. Kennecott wants to go into an open pit operation which would drastically alter a large section of the reservation. It would entail an investment on their part of $260,000,000. Two Thousand workers and Six Thousand new people would be brought into the community which would more than double the population of our reservation within a few years. There are also other mining companies exploring throughout our reservation. There is drilling 20 miles from the Kennecott site of Hanna Mining and there is a good chance they've struck another large low grade copper deposit. There are also a couple of other hot spots being sought out. A couple of years ago we weren't even thinking about getting into mining, then over night we thought we'd better get started gearing up for these." Clark went on to explain that the tribe's economy is now dependent upon timber for revenue which ties the destiny of their people to the ups and downs of the housing industry. They are now hoping to diversify their economic base in order to become less dependent upon one commodity.

Acoma Pueblo with well known coal and uranium reserves had decided not to go into mineral development until the tribe is certain of all the impacts and benefits of development. According to Acoma Governor, Merle Garcia, "I think this is the advantage that the tribes who haven't gone into developing minerals here, we are a step ahead of tribes who already are in the process because we know what the problems are. From the experience of those other tribes I think we can come out with a better deal."

Experiences related by participants indicated the following problems.

1 Lack of knowledge of mineral resources on their lands. The data companies gather from preliminary investigations, past experience and aerial photography usually results in the company having more information on the tribes' minerals than the tribe has.

The most prevalent course of action on Indian Land (there are exceptions) is for all actions to be initiated by the companies. The company determines when it wants to mine, how it will mine and what the royalty will be. Mining development only becomes an option whan a mining company comes in with its vast data, charts and maps and says we want to develop here. The decision to develop then is often not something the tribe is able to plan out ahead of time and determine how it fits into their tribal plans. It is rather a decision which is stumbled on by chance. The positive approach is for the tribe to make the decision to go into mineral development, determining the nature and extent of reserves and then initiating the development process themselves bases on their own goals.

The current Bureau of Indian Affairs Mineral Inventories Program was heavily criticized. The extent of funding for the program is inadequate. While the federal government has been spending billions of dollars in providing grants, subsidiaries and tax incentive to multi-national mining companies to whom it has no trust responsibility, the BIA program is funded at a level of only $1.5 million dollars per year. In addition the program is hardly a timely effort; field investigations will not be completed until between 1983 and 1985 and the most important step, the actual core drilling will not be completed until between 1985 and 1992. Several participants questioned the quality of the effort. According to one participant, "Do we rely on the Bureau which has the nickname of doing half the work or would it be best for tribes to contract the program on their own." Another explained "There was one report done down on the Colville reservation that I had a chance to appraise and it was very badly done. There were resources being taken out of the ground that were not even mentioned in the report."

Several recommendations were made on how to improve the situation.

A) Inventories should be concentrated in areas where there is greatest pressure to develop.

B) Tribes should be able to contract exploration under the mineral inventories program.

C) The program should be better funded with more tribal input.

2. There is a lack of expertise both in the Bureau of Indian Affairs and among many tribes to adequately evaluate, negotiate and moniter mineral development. Mining companies who have such expertise are in a better bargaining position than tribes in securing advantages for themselves.

The lack of expertise was admitted by former BIA Commissioner Morris Thompson at a past AIO Resource Conference. Thompson stated "We don't have the expertise to plan and design and do the long range planning for resource development. We're fairly embryonic in our approach to mineral companies and we don't have the expertise these companies have. I'm therefore, afraid that when we sit down and bargain it will be a tremendous disadvantage, as you probably are at right now, in dealing with these companies. The first concern since we don't have all these tools to deal with, will we be ripped off?"

The Bureau is trying to alleviate this situation. In one case it has provided a tribe with a Bureau of Mines engineer and geologist to assist in evaluating mining feasability. It also provided the tribe with funds for a negotiator and legal assistance. Other tribes are hoping that such expertise and funding can be made available to them.

3. There was some concern as to the power of tribes to regulate the impacts of mining development that result from nearby off-reservation development. If an orebody exists which is both on the reservation and off the reservation and the tribe rejects a company's offer, the tribe may end up paying all the costs of development and gaining none of the benefits.

4. Many tribes were concerned about the confidentiality of much of the information on their mineral resources especially water resources. Water is needed for mineral development thus necessitating accurate water inventories before considering development. If the information on water resources is collected or compiled under programs which are channeled through state agencies than states have access to such information. The HUD 701 comprehensive plans is an example of this kind of program. In many cases this information could affect current litigation efforts.

A GLOBAL VIEW

Marian Radetzki, former chief economist of the Intergovernmental Council of Copper Exporting Countries, (CIPEC) is one of the world's most prominent authorities in the economics of international copper and the world copper industry. Mr. Radetzki is currently researching issues of copper and national development at the University of Stockholm in Sweden. In his presentation he discussed methods of determining the value of copper deposits, production and consumption trends in the world copper market, the formation of copper prices, the effects of extreme dependence on copper exports on certain developing nations and the ownership structures of multinational corporations. It is important to realize that much of his analysis is not only applicable to other metals but also to other commodities.

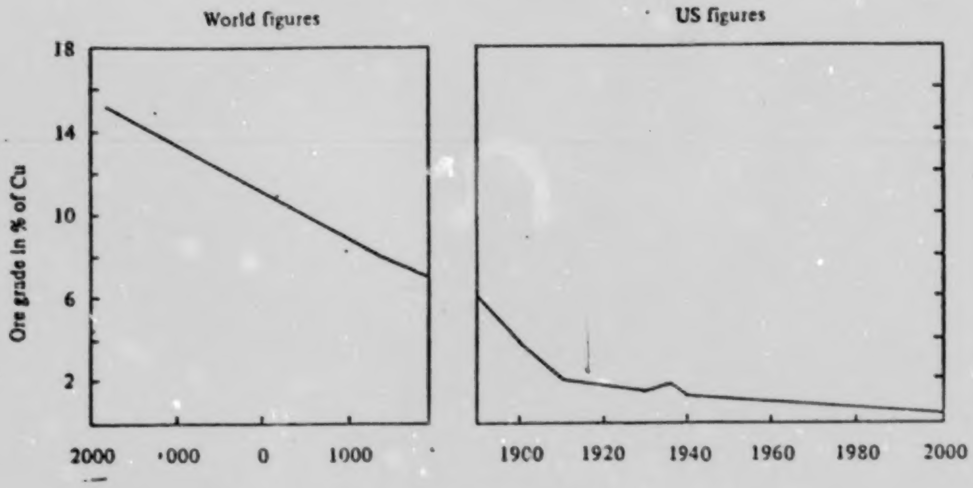
THE DEVELOPMENT OF COPPER DEPOSITS

Suppose one finds that there is a copper deposit on his land - how does one determine the value of that deposit? There are three considerations that need to be made in order to identify that value. The first consideration in evaluating the value of a copper orebody discovered is it's copper content; that is the percentage of copper metal contained in the copper ores mined.

The average copper content of ores mined over an extended period of time is explained in Figure 1. Ore grades, a key determinant of cost, have declined continously - from a world average of 10%, two thousand years ago, to 5% in the nineteenth century all the way to an average of no more than 1% and in many cases one-half of 1% or less today. If the copper content of an orebody is considerably above today's average its value will be higher since it is easier and cheaper to extract the copper content. If the content is average or below average than its value will not be particularly high and it may not be mined for a number of years.

Figure 1

Average Grades of Ore Mined



Source. J. David Lowell, 'Copper resources in the 1970s', The 1970 Jackling Award Lecture, *Mining Engineering* (April 1970).

Another prime consideration in determining the value of the orebody is the size of the orebody. If an orebody contains high grade ore, 4 or 5%, but is a very small orebody the mine that can be constructed around the body will be small; thus the economic benefits that can be attained will be small. Some of the new mines in the world today are low in copper content but are orebodies which are very, very large in size.

A third issue related to the value of the orebody is whether it is a surface body, (an orebody close to the ground), or if it is a deep orebody located several hundred feet below the ground. If it is very deep it can only be developed by under-ground mining which requires greater costs. Under-ground mining usually only pays off if there is a higher copper content in the ore. In an open-pit mine, low copper content ores can be developed more readily because of the easier access and relatively lower cost.

THE CONCEPT OF MINERAL RESERVES

Mineral reserves is an extremely vague and elastic concept. Definition of reserves vary. Variations in price may cause additions or subtraction from what is considered economically viable reserves. Mining firms which have the most detailed information of minerals availability, are often unwilling to disclose their knowledge.

Official statistics today indicate that copper ore reserves available in the world are of a magnitude that would last, it appears, for about 30 years production at the present rates. This suggests to many that copper will not exist anymore after 30 years because there is no liklihood that production will decrease. However, looking at copper reserve figures 20 years ago or one hundred years ago, (Table 1) the reserves that existed at that time were also sufficient for about 30 years production. The conclusion can be drawn that in 30 years time, when the current reserves are exhausted, there will probably be reserves sufficient for another 30 years production. The fact is that the concept of reserves implies that the orebody is known to exist and has a proven size and content. Drilling has been undertaken in order to estimate the amount of minerals available and the cost of extraction has been computed. To prove a reserve exists costs money. Thus, if there are already reserves identified for a number of years production, there is not much economic purpose

Table 1

Trend of U.S. Copper Reserve Estimates

Year	Reserves (m tons)	U.S. Mining Production (000 tons)	Life of Reserves (years)
1931	16.9	540	31
1936	21.3	650	33
1945	26.3	720	37
1960	29.2	990	30
1973	74.7	1,570	48

Source. A.D. McMahon, Copper: A Materials Survey, U.S. Bureau of Mines Information Circular 8225 (Washington, D.C. 1965); U.S. Bureau of Mines Commodity Data Summaries 1974; and World Metal Statistics.

in expanding the reserves. It is not practical to spend more money to build up additional reserves with the current reserves projected to last for the next 30 years. In the African Nation of Zaire, the large government copper company has an explicit policy of extending reserves through further drilling and exploration each year to the amount equal to the reserves which have been exhausted through exploitation. Since it is well established that the amount of copper available is very great they can continue with that policy for a long time.

PRODUCTION, CONSUMPTION AND TRADE OF COPPER

The process involved in producing copper begins with the mining of copper ore which consists of .5% to 2% copper metal, the milling and concentrating of copper into a product called concentrate which is 30% copper metal. Many companies export the ore from the exporting nation at this point. The next state is the smelting of the concentrate to obtain blister copper which contains 99% metal. In many industries it is further refined to 99.9% copper metal.

Table 2

World Copper in 1974

(Thousand Tons Produced)

Copper Scrap Supply	
Mine Supply	4180
1. Producing Countries	
a. Six Developing Countries	
1. Chile	900
2. Zambia	700
3. Zaire	510
4. Peru	210
5. The Phillipine's	210
6. Papau New Guineau	190
Total	2720
b. United States	1450
c. Other Non-Socialist (primarily Australia, Canada)	2040
d. Socialist (Primarily U.S.S.R. and China)	1550
Total World Mine Supply	7760
Total World Copper Supply	11,940

Source: Marian Radetzki

There are two sources of copper. Raw copper that is mined from orebodies and refined copper which is salvaged from scrap. Scrap copper amounted to 35% (4,180,000 tons) of all copper supplies in 1974. Copper scrap is salvaged from worn-out or obsolete copper products such as old automobile radiators, or from copper manufacturing industries who have left-over copper waste.

Copper that is mined totals 7.8 million tons and comes from the United States, 1.45 million tons; from the Soviet Union, 1.0 million tons; from the Six developing nation: Chile, Peru, Zaire, Zambia, The Phillipines and Papau New Guinea 2.72 million tons; and others 2.7 million tons.

About half of the total mine supply is not used by the producing country but is exported to more industrialized countries. The six developing countries, who only produce 35% of the world mine supply provide 70% of the net exports. This is largely because the other large producers consume most of their copper domestically.

A nation which has rich deposits of copper has the option of exporting it in unrefined form, refining it further and exporting a more finished product or to use the copper in manufacturing industry within the country. All things being equal, the most profitable use of the copper would be to use it domestically in manufacturing industries. Such use results in the creation of a more diversified and wealthy economy. Refining the copper adds more value to the copper and in turn brings more wealth into the country. The least desirable option would be to export the copper in raw form.

However, in nations with a relatively undeveloped manufacturing sector, the use of the copper would be unfeasible; all of the copper would not be consumed. The development of a manufacturing sector would take a number of years - in the mean time there would be a surplus of copper. The next option would be to attempt to export a more refined, and more valuable, copper product. The limitation here is similiar to that of developing a manufacturing sector.

A possible solution would be for a group of copper producing nations to work cooperatively on the development of a copper related manufacturing industry and processing industries. The barrier of lack of capital could be reduced and a larger market for the copper could be obtained. However, the major barriers would still exist. Those are the policies of the industrialized nations coupled with the goal of profit maximization of the copper corporations. These nations and corporations are already operating, processing and manufacturing ventures within their own countries. Processed copper and copper products from the developing nations would constitute a competetive threat to their operations. To protect these operations the host-nations would institute high tariffs which would make products from the developing nation uncompetitive with their own. The result would be a limited market for finished products while unprocessed products enjoyed unlimited markets. The change in the available market could eliminate the advantage of processing.

Table 3

WORLD TRADE FLOWS OF COPPER IN 1973, THOUSAND TONS*

World net exports	thousand tons	per cent
Zambia	670	18.3
Chile	657	17.9
Canada	616	16.8
Zaire	488	13.3
Philippines	217	5.9
Peru	207	5.6
Papau New Guineau	180	4.9
South and South West Africa	133	3.6
Australia	103	2.8
Total above 10 exporters	3,271	89.1
Other net exporters	389	10.9
Overall total	3,660	100.0

The major exporting nations are outlined in Table 3 and 4. Zambia, Chile, Zaire, The Philippines and Papua New Guineau all have limited domestic use of copper and thus export it. Canada, Australia and South Africa, all older, more industrialized nations use a large portion internally but their reserves are larger than their internal needs resulting in a surplus.

*Source: Marian Radetzki

Table 4

Major trade flows of copper

	Concentrates			Blister			Refined		
	West Europe	North America	Japan	West Europe	North America	Japan	West Europe	North America	Japan
Zambia				21		21	379	5	161
Chile	30	10	59	80	16	13	240	42	21
Canada	35	13	297				158	115	11
Zaire			19	220			219		10
Philippines		4	217						
Peru		15	19	31	83	18	6	4	
Papau New Guinea	70		110						
South and Southwest Africa	15			66	23	3	29		
Australia	1		42			9	40		7

Note to table on major trade flows of copper: Exports to North America equal by and large exports to the USA.

Source: Marian Radetzki

Table 5

REFINED COPPER IN 1974, WORLD DEMAND-SUPPLY BALANCE BY MAJOR REGIONS, THOUSAND TONS

	Refined consumption	Scrap for refining Estimate	Primary production	Total internal supply	Surplus (+), or deficit (-)
Non-Socialist					
Western Europe	2,600	350	320	670	-1,930
USA	1,960	400	1,450	1,850	- 110
Canada	270	30	830	860	+ 590
Japan	830	120	80	200	- 630
Developing Nations	590	50	3,530	3,580	+2,990
Total	6,250	950	6,210	7,160	+ 910
Socialist	1,870	280	1,550	1,830	- 40
World Total	8,120	1,230	7,760	8,990	+ 870

Note: A small share of primary copper produced is used in other forms than refined copper. We have disregarded this fact in the above table, and as a consequence our estimated surplus figure is somewhat exaggerated.

Source: Marian Radetzki

The trade flow of the copper from the exporting nations is outlined in Table 5. The copper produced from the developing nations is received by the major importing nations; the Western European Nations, Japan and the United States. Japan and Western Europe have almost no domestic reserves (except scrap from previously exported copper, which does give them a stockpile of copper that could last several years if exports ceased) and are practically dependent upon the exporting nations for supply. The United States, the nation with the largest domestic supply, consumes so much that it must import almost half as much as Japan. The Soviet Union and other Socialist countries are totally self-sufficient. They have no need for imports and have chosen not to export.

The import-export situation is summarized in Table 6. From the years 1950-1974 there have been a number of major changes in the growth rates of copper production which reveal a great deal about the political economics of mineral developments. There are four major groups of countries who produce copper. The United States, the largest producer and consumer; Australia and Canada who are consumers who have excess supplies and thus are able to export; the four old CIPEC countries who have years of experience as resource colonies; and other countries who are primarily countries newly involved in copper development.

The four old CIPEC countries are Chile, Peru, Zaire and Zambia; nations who in the 1960's joined together in the hope of altering the handicaps of being colonies whose economics were dependent upon the demands of industrialized nations for raw materials.

In the period of 1950-1960, the growth of production in those four countries was very fast, a rate of 6.2%. In those years, the four nations were still economically colonies where multinational corporations were free to act as they pleased while reaping windfall profits.

In the 1960's this growth was reduced drastically to 2.8%. The reduction in CIPEC growth was compensated by an increase in the United States from a rate of 1.7% to 3% and other non-socialist countries including the Philippines and Papau New Guinea from a rate of 4.9% to 7%.

It is important to note that the decreased CIPEC expansion

Table 6

Growth trends in world primary copper production, thousand tons

	1950	1955	1960	1965	1970	1974	Annual Cumulative growth, % 1950-60	1960-74	1950-74
Non-socialist									
USA	830	910	980	1230	1550	1450	1.7	3.0	2.3
Canada, Australia	260	340	510	550	760	1090	7.0	5.5	6.1
Four old CIPEC countries	870	1070	1590	1750	1970	2320	6.2	2.8	4.2
Other countries	330	400	530	620	870	1350	4.9	7.0	6.0
Total	2290	2720	3610	4150	5150	6210	4.7	4.0	4.3
Socialist	230	390	630	920	1190	1550	10.5	6.5	7.5
World Total	2520	3110	4240	5070	6340	7760	5.3	4.5	4.8

Source: Marian Radetzki

was not a result of government policy but rather, the multinational copper companies became more reluctent to invest in CIPEC countries following moves by these nation to gain more control over development and a more equitable share of the profits. Expansion slackened because, at this time, the governments lacked the experience necessary to carry out their own expansion program. The situation is now beginning to change. As these governments have gradually acquired experience in the development and management of copper ventures, there is now a basis for government sponsored and implemented expansion policies.

The resulting decrease in expansion of growth rate was not without repercussion. The contraction resulted in some changes in the government policies of these nation. The democratically elected government of Chile was toppled in a coup whereupon the new government had a more benevolent attitude toward multi-national companies. Peru, faced by ensuing fiscal problems was forced to offer more attractive benefits to the copper corporations in exchange for badly needed loans from U.S. anks and international lending agencies. These changes are not coincidences nor were they arrived at by the free will of the people within those nations. The home governments of the copper companies have acted to protect the interests of these companies as can be seen by U.S. involvement in the coup in Chile. Home governments also act more covertly through the use of trade policy, aid policy and loan policy.

The increased activities of multinational copper corporations on Indian lands may well be a result of the actions taken by the CIPEC countries to demand more equitable benefits. The trend towards increased production growth in the U.S. has resulted in a rapid movement to explore for copper on Indian lands.

GROWTH RATE OF COPPER AS COMPARED TO GROWTH RATES OF OTHER METALS

Copper production, relative to the production of 5 other metals, has decreased since 1950. In 1950 copper was the most commonly used of these metals. Aluminum production, relatively small in 1950, is now twice as great as that of copper. The relative production of zinc and nickel has not changed while tin has undergone an extreme production decrease.

The almost non-existent growth of tin production illustrates the consequences of metal prices becoming too high. Tin prices have rapidly increased and consequently the demand has decreased

Table 7

Growth trends in world mine production of six major non-ferrous metals

	1950	1955	1960	1965	1970	1974	Annual cumulative growth, per cent 1950-74,	1960-74	Price in 1974 /ton	Approx. value of 1974 output billion US
Aluminum	1510	3100	4530	6590	10320	13910	9.7	8.4	765	10.6
Copper	2530	3130	4240	5070	6340	7760	4.8	4.5	2058	16.0
Zinc	2160	2990	3350	4240	5340	5890	4.3	4.1	1240	7.3
Lead	1520	2190	2380	2750	3410	3570	3.6	3.0	592	2.1
Nickel	140	250	340	440	670	740	7.2	5.7	3820	2.8
Tin	180	190	190	200	230	220	0.8	1.1	8190	1.8

Source: Marian Radetzki

as many users have found it more profitable to substitute other production decrease.

The very rapid growth of aluminum implies that in many applications aluminum can be used in the same way copper can, therefore the relatively lower price of aluminum has caused many users to substitute aluminum for copper. The changes in the uses of copper and aluminum is largely due to the fact that while aluminum production costs have been decreasing, copper production costs have been stable.

Aluminum is a relatively new metal. The technology to extract and process the aluminum was until recently, relatively undeveloped, thus costs were higher. Over the period of 1900-1940, as technological innovations have made aluminum less costly to produce, aluminum has become more widely used.

Copper is a very old metal. Extraction has been going on for centuries and the grade of ore has gradually declined. Technological progress has gradually reduced the real cost of production from a given quality of ore and has tended to counteract the upward push of costs resulting from the decrease in the grade of ore. In real terms, production cost have not changed substantially in this century.

The result is decreasing aluminum prices and stable copper prices. In 1895, copper was half as expensive as aluminum while today copper costs three times more. Copper is not the only metal which is being replaced and if aluminum costs decrease even more, steel may begin to be replaced with aluminum.

Another development that could have an impact on the production of many minerals is the possibility of mining these metals from the ocean floor. Nodules of the size and shape of potatoes which contain a number of valuable minerals including copper, cobalt and nickel are found on the ocean floor. The technology to harvest these minerals is now being developed. Some experts have estimated that by the 1980's the entire world demand for cobalt, and a substantial share of world demand for nickel and copper could come from the ocean floor.

We are likely to continue to see very fast growth of the use of aluminum. However, overall consumption of all metals has grown so fast that despite the fact that some of the markets for copper have been taken over by aluminum, there has been substantial growth in copper.

There is the possibility that the technological progress which was specific to aluminum will cease or slow down so that in the future copper and aluminum will grow at equal rates. The increased cost of energy has done this to some degree. Aluminum production is very energy intensive; half of the production costs are energy costs, copper is less so. The increase in energy prices in 197 has decreased the competitiveness of aluminum vs. copper. This may not be true in terms of long-run costs to aluminum companies. They are now attempting to adjust to the situation by taking steps to relocate production facilities to areas that already have a very large scale cheap energy supply and thus avoid many of the high energy costs.

These developments will have very important consequence on the value of minerals under reservation lands. If minerals can be developed from under the ocean at lower costa and if copper becomes excessively replaced by aluminum or other substitutes, then copper (or nickel or zinc) operations on reservation lands could be severely curtailed. Tribes should consider these factors and insure that any contracts formulated with companies permit the flexability required for adjustment to changing conditions.

THE FORMATION OF COPPER PRICES

The demand for metals on the world market depends almost entirely on the business cycle. When there is boom, then demand increases; when there is a recession, the demand decreases. Producers can deal with this situation in only one of two ways.

They can produce at maximum capacity at all times and accept the variation in demand by accepting variation in prices. If there is a boom, they accept high prices; if there is a recession, they accept low prices, always operating at maximum capacity. The other alternative is for them to demand a fixed price for the metal and accept the variation in demand by varying their production capacity. When there is a boom, they produce at maximum capacity and receive price x; when there is a recession, they produce less, at minimum capacity, and still receive price x.

Copper producers in the world market act in the former way. They have decided that it is to their advantage to produce at full capacity at all times and accept very wide price variations.

Aluminum producers act in the latter way. They have decided it is to their advantage to keep prices stable all of the time and instead vary their production capacity widely.

In order to determine the relative value of copper as compared to other commodities one needs to subtract the effects of inflation from the price. This is known as the Real Price. The thick black line on Figure 2 (following page) illustrates the real price of copper for the years 1964-1976. The actual selling price of copper, which includes the effect of inflation is known as the Nominal Price, the thin black line on Figure 2.

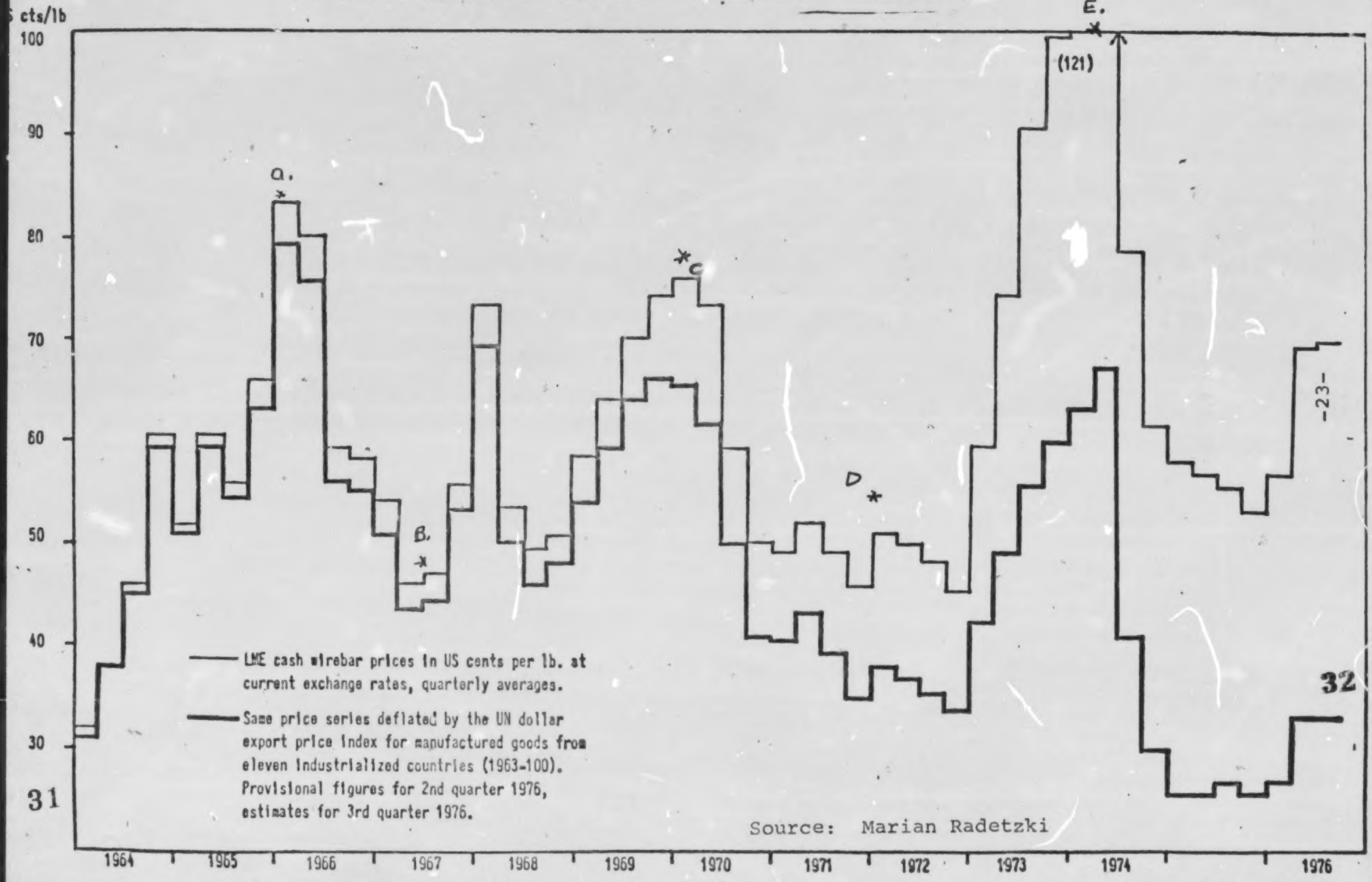
The nominal price of copper is constantly moving upward due to inflation. The real price has actually been decreasing. The severe recession in the industrialized world has resulted in the real price decrease. Today's world market nominal price of copper is at around 60¢ per pound. The real price is at around 30¢ per pound. This is the lowest price of copper in the post war era.

With these prices and inflationary costs of production it is not profitable to construct new mines. At present it is estimated that in order for a new mine to be opened, prices would have to rise to at least $1.00 per pound.

In the copper market there are basically two pricing systems. The world market where prices vary freely and the U.S. producers price system where prices are controlled by U.S. producers. U.S. producers have decided to vary their production capacities rather than price.

Figure 2.

COPPER PRICES AND INFLATION: THE PRODUCERS' REAL REVENUE



Source: Marian Radetzki

The U.S. price has been on the average 10% lower than the world free market price (Figure 3, following page). The price has been more stable since U.S. producers have chosen to vary their production capacities with changes in demand. Thus, U.S. prices are somewhat higher than world prices during recessions and considerably lower during booms.

Looking at copper prices from the years 1850 to 1976 the prices seem to be fairly stable with a few major price fluctuations. (Figure 4) The fluctuations can be attributed to exceptional conditions rather than any general trends.

The gradual decrease in prices from 1850-1880 was due to several major technological innovations which drastically lowered the cost of mining. In the late nineteenth century prices skyrocketed again due to short-term monopoly action by U.S. companies. Prices then tended to level out until the price decline during the great depression.

The post-war period has been characterized by very high price levels. The major causes for these high prices have been:

1. decreased supply growth from the developing world. The struggle for economic freedom and control by these countries led to decreased multinational investments there, which in turn led to decreased production.

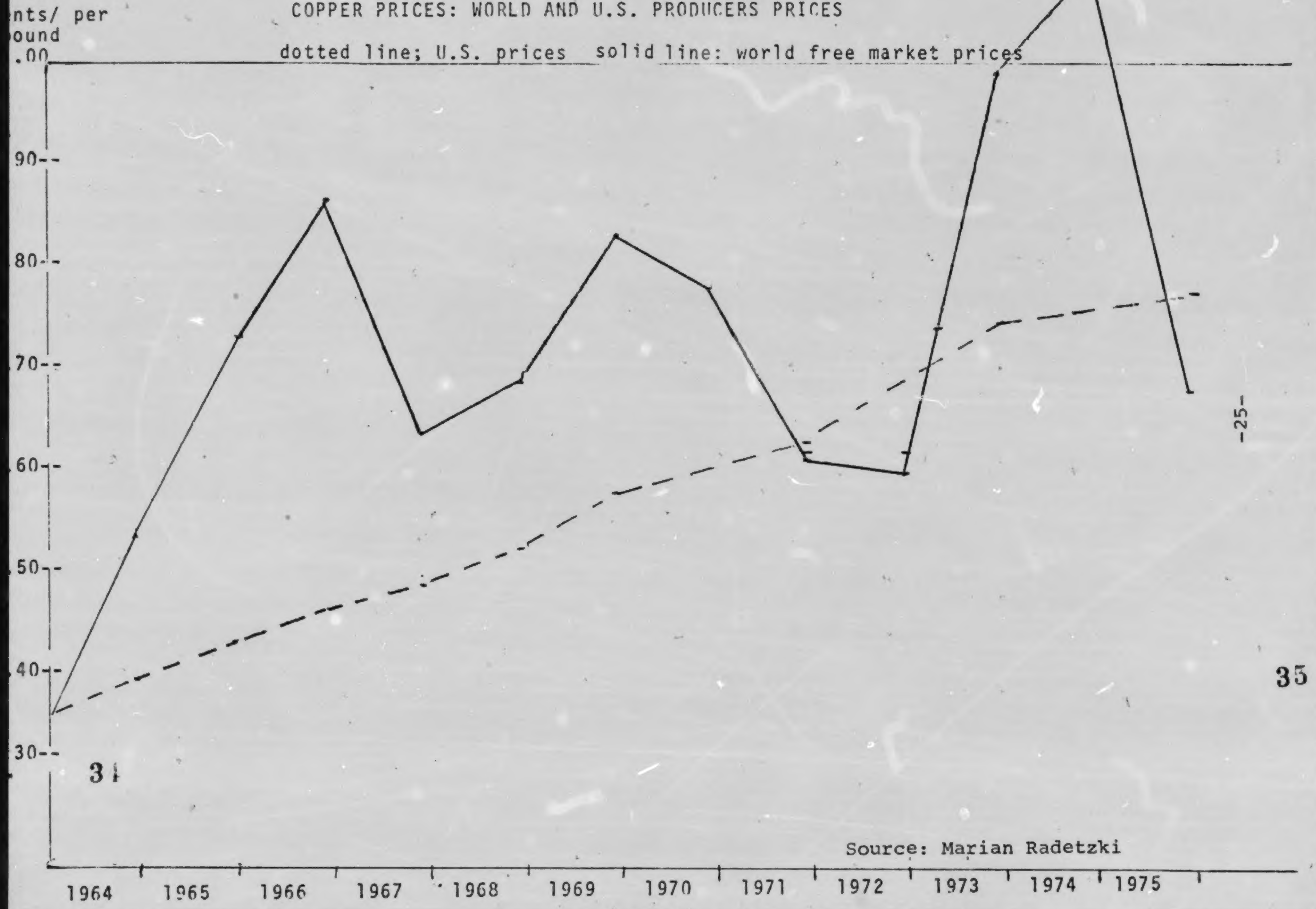
2. the increased demand for copper caused by the Vietnam war.

3. the exceedingly high growth rates exhibited by industrialized countries in that period in general.

Today's prices are exceedingly low compared to long-term real copper prices. One can speculate that prices will rise in the future if economic conditions in general improve.

FIGURE 3

COPPER PRICES: WORLD AND U.S. PRODUCERS PRICES

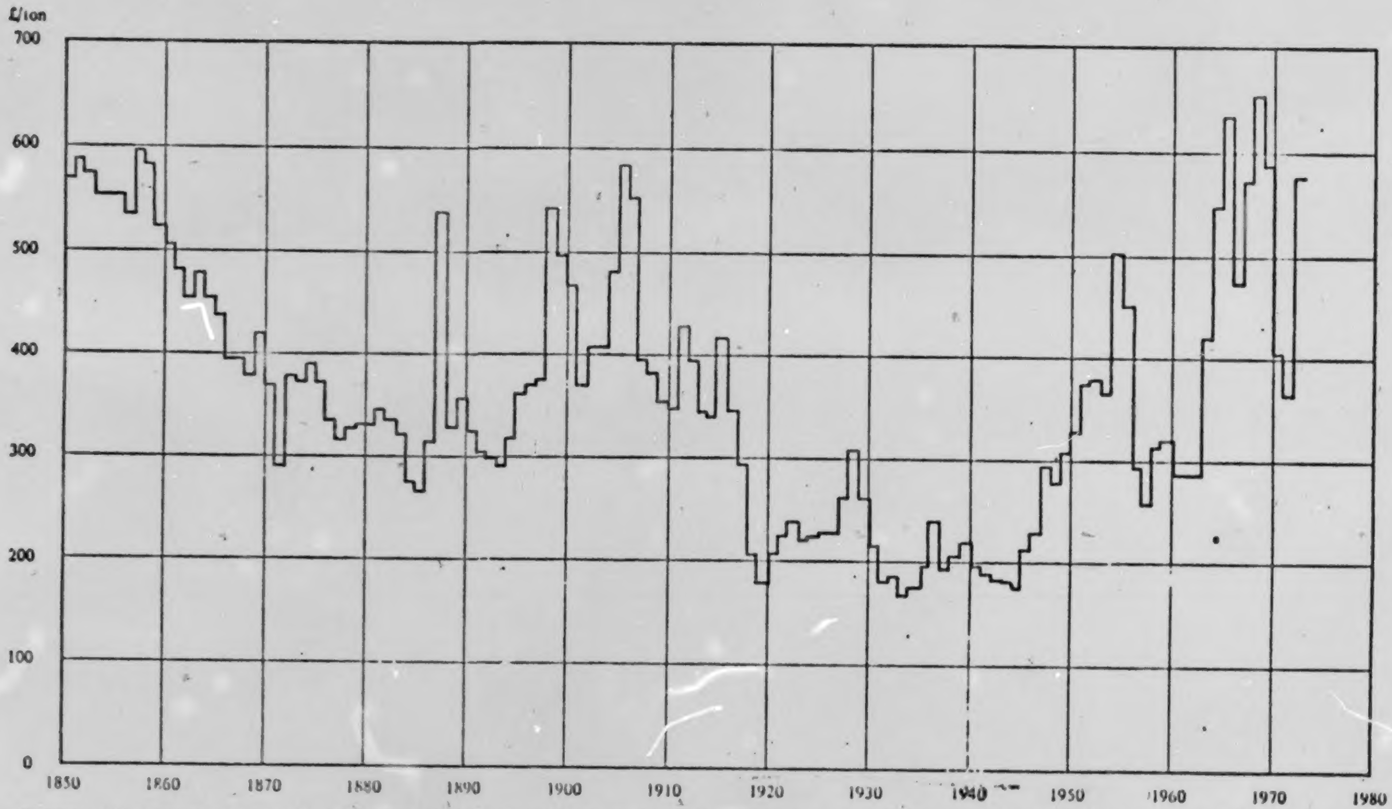


Source: Marian Radetzki

31

35

Figure 4 The Real Price of Copper



Sources. (1) Copper prices. 1850–69: Metallgesellschaft, *Metal Statistics 1961–1971*, 59th edn. (1972) p. 315; 1870–1956: H. G. Cordero and L. H. Tarring (eds.), *Babylon to Birmingham* (London: Quin Press, 1960) pp. 467–8; 1957–71; Metallgesellschaft, op. cit., p. 292; 1972–3: *Metals Week.*

(2) Wholesale prices in the UK. 1850–70: B. R. Mitchell and P. Deane, *Abstract of British Historical Statistics* (Cambridge University Press, 1962) p. 474; 1871–1920: ibid., p. 476; 1921–34: ibid., p. 477; 1935–38: ibid., p. 477; 1939–60: D. Butler and J. Freeman, *British Political Facts 1900–1960* (London: Macmillan and New York: St. Martin's Press, 1963) p. 222; 1960–70: OECD, *Main Economic Indicators: Historical Statistics 1954–1971*, p. 460; 1971–73: OECD, *Main Economic Indicators* (March 1974) p. 106.

Note. **Nominal average annual copper prices in sterling have been depleted by a linked index (1970 = 100) of wholesale prices in the UK.**

Source: Marian Radetzki

Table 8

SIX DEVELOPING COUNTRIES' DEPENDENCE ON COPPER

Country	Population 1974, million	GNP 1974 estimate billion $	Overall exports 1973 million $	Copper exports 1974, estimate thousand tons	Impact on annual exports value from change in copper price, million $		36 c/lb annual price diff. eql. the follwng. % shares of	
					1 c/lb	36 c/lb	overall exports 1973	GNP 1974
Chile	10	9.4	1,230	840	18.5	670	54	7.1
Papau New Guineau	3	1.1	230	170	3.7	122	53	11.5
Peru	15	9.5	1.050	210	4.6	152	15	1.6
Philippines	41	11.0	1,800	210	4.6	152	8	1.4
Zaire	20	3.0	1,000	500	11.0	363	36	12.5
Zambia	5	2.2	1,140	680	14.0	492	43	22.3

Source: Marian Radetzki

THE EXTREME DEPENDENCE ON COPPER BY SOME DEVELOPING COUNTRIES

The six developing nations who currently produce 70% of all copper exported are in a situation where their national economy is extremely dependent on copper for revenue. This is illustrated in Table 8. The extreme dependence on copper revenue can be seen by the fact that if the price of copper drops 1¢ per pound in a year, Chile would lose $19 million U.S. dollars in exports, Papau New Guinea $4 million, Zambia $15 million, and so on. Between 1974 and 1975, the price of copper decreased 36¢. In that situation, Chile lost $680 million U.S. dollars in revenue from exports. In terms of percentages, the drop in copper price of 36¢ per pound would result in a decrease in export revenue of 38% for Zambia, 29% for Zaire, 28% for Chile, 22% for Papau New Guineau, and 13% for Peru. Since these countries are primarily exporting economies, dependent mainly on exporting copper, the 36% price decrease has a tremendous effect on their total Gross National Product. They would face reduction in Gross National products of 24% by Zambia, 13% by Papau New Guinea, 8% by Chile.

The economic well-being of these nations is extremely affected by the fluctuation of world copper prices.

In 1973, when the OPEC nations raised their prices from $3 to $11 per barrel of oil, the effect on the Gross National products of the industralized nations was only 2-3%; insignificant as compared to price decrease in copper for the copper exporting nations.

There is an extreme danger in becoming dependent on the exporting of a single commodity for a large percentage of national income. Such dependence effectively ties the entire well being of a people to a market over which they have virtually no control.

THE OWNERSHIP STRUCTURE OF MULTINATIONAL MINING CORPORATIONS

The entire copper extraction industry has been dominated by very few decision-units; decision-units meaning governments or private companies who own the copper extracting industries. In 1960 (Table 9, following page) the major decision-units were several multinational corporations: Kennecott Copper (American), Anaconda Copper (American), Anglo-American (British), Union Minerie (Belgian), and International Nickel (Canadian). The Soviet Union was at that time the only major government with a nationally owned copper industry. In 1960, these eight units accounted for 64% of the total copper production in that year.

Table 9

LEADING COPPER MINING INTERESTS IN 1960, PRODUCTION, THOUSAND TONS.

UNIT	PRODUCTION	CUMULATIVE	CUMULATIVE % of WORLD PRODUCTION (4,200)
USSR	500		12
Kennecott	520	1,020	24
Anaconda	440	1,460	34
Anglo-American	360	1,820	43
Union Miniere	300	2,120	50
Roan-AMC group	220	2,340	55
Phelps, Dodge	220	2,560	60
Intern. Nickel	140	2,700	64

Table 10

LEADING COPPER MINING INTERESTS IN 1975, CAPACITY, THOUSAND TONS

Unit	Capacity	Cumulative	Cumulative % of world capacity (9,800)	Geographical location of interests
USSR	1,120	1,120	11	USSR
Zambia	950	2,070	21	Zambia
Chile	760	2,830	29	Chile
Zaire	510	3,340	34	Zaire
RTZ	430	3,770	38	Canada, PNG, S. Africa, Spai
Asarco	420	4,190	43	Peru Australia, Canada, Mexico,US
Kennecott	420	4,610	47	US
Newmont	340	4,950	51	Canada, US, S. Afric
Phelps Dodge	300	5,250	54	US
Anaconda	240	5,490	56	Canada, US
Poland	200	5,690	58	Poland
Noranda	160	5,850	60	Canada
Intern. Nickel	160	6,010	61	Canada

Source: Marian Radetzki

In 1975, the picture had changed considerably with a large portion of the overall capacity of copper production controlled by governments. The major decision units were, in that year, the Union of Soviet Socialist Republics, Zambia, Chile and Zaire. These governments are complete or majority owners of copper industries in their nations. These four governments accounted for 34% of total copper production in 1975. The nationalization of copper in Chile displaced Kennecott and Anaconda as the leading producing corporation and Rio Tinto Zinc, a British concern became the leading multinational company; ASARCO (American), Newmont (American), Noranda (Canadian) Kennecott, Anaconda, International Nickel (Canadian) are all leading producers.

New entrees into the copper industry are oil companies such as Exxon who have all made a policy decision to move into a range of different products, mainly other energy sources but also into copper, zinc, timber and other commodities. Exxon is currently one of leading companies involved in exploration; Anaconda Copper was recently purchased by Atlantic Richfield Oil Corporation; Shell Oil is actively exploring for copper in Peru, and so on. One can expect these companies to dominate a larger share of metals production in the future.

Although governments such as Zambia, Zaire, and Chile are now owners of copper projects within their countries, they do not necessarily make the basic decisions involved in copper marketing, management, and prices. In fact in Zambia, Anglo-American Corporation and AMAX manage the plant, handle over-seas marketing and control the technology of the mining operations. Furthermore, the demand for the copper is controlled by the needs of markets largely controlled by these same companies in Europe and the United States. Even though Zambia owns a large portion of the operation, the basic decision-making is made by European and American companies.

In Zaire, where since the late 1960's, the copper industry is entirely government owned, the industry is still managed by the Belgian interests who formerly owned the mines. The Belgians are paid enormously well for managing the projects; they also own the smelters or refineries in Belgian to whom the copper is sold, and the companies who supply the mine with equipment. Taking advantage of this situation, the Belgians sell their equipment to the Zairean company that they manage at high prices and sell the copper to their smelters and refineries at low prices.

Although there are several major copper producing companies in the world, their interests are pretty much the same. There are a number of financial and personnel linkages between these companies. Personnel and individual board of directors of one company sit on the board of directors of their competitors. The finance network, also, ties all of these companies very closely together.

Due to the high costs of mineral extractions, these companies are entering into joint ventures with each other to develop mineral deposits furthering the ties that draw their interests together.

One can see that the copper industry and the economies of copper producing nations are primarily controlled by the interests of multinational corporations based in western industrialized nations and that quite often, these corporations share common goals and interests. The growing control over copper industries by governments is changing this situation to some degree although there have been no major changes in the copper market itself.

THE PAPAGO EXPERIENCE

Addison F. Smith, Mining Director of the Papago Tribe of Arizona, had directed the largest Indian non-fuel mine production for the last seven years.

The Papago Copper Mines

The Papago Nation, surrounded on all sides by Copper development, lies in the middle of the nations largest copper producing area - the Southwest Arizona Copper Belt. On the Papago Reservation three deposits have been discovered and 3 projects are currently in development or operation. The projects consist of the Asarco Mission Pit; which is only partially on the reservation with the Papago portion consisting of two ore bodies called the North San Xavier and South San Xavier mines. These are open pit mines and are located on alloted lands in the Southern part of the San Xavier reservation. The North San Xavier ore body consists of approximately 72 million tons of sulfide ore averaging 0.54% copper, and the South San Xavier consists of 38 million tons averaging 0.54% copper. The largest mine is the Hecla Lakeshore mine located in the Northern part of the main reservation. This mine is a joint venture between Hecla Mining and El Paso Natural Gas. It is an underground mine consisting of approximately 240,000,000 tons of .70% sulfide copper, 207,000,000 tons of .70% oxide copper and 23,000,000 tons of 1.7% tactite copper (1.7% is a very high grade of copper for that part of the country). The development consists of basically two mines, one mining the sulfide copper and the other oxide copper. These are mined separately, treated separately and sold separately, thus creating some problems in royalty accounting.

The third mine, the Newmont Vekol Mine will be an open pit mine consisting of approximately 105 million tons of .50% copper, a fairly low grade deposit. With the current low price of copper it is unlikely this mine will get off the ground in the near future.

Royalties

The 250 allottees involved in the ASARCO mine are now receiving about 1.3 million dollars total in royalties with increases expected as production picks up. The Hecla mine, not fully in production, is expected to bring in around 4-5 million dollars in royalties payed. The Vekol mine is expected to bring in approximately two million dollars a year.

The royalties received are split 50/50 between the Central Tribal Government and the district governments. The funds are expected to be adequate to operate the tribal government and to use as capital to develop other economic sectors. The total amount of land used for mining purposes, under all three developments equals 20,000 acres or less than 1% of the reservation land base.

Linkages

As a result of the copper mining the tribe has been able to start its own utility company. The utility sells all power to the Hecla mining project; copper mining is fairly energy intensive. The Hecla mine uses as much power as the nearby city of Casa Grande (pop. 25,000). The profits created by selling power to the mines has allowed the tribe to provide people on the reservation with power.

The tribe also operates Papago Chemicals which sells nitrate for blasting to the mines and ammonia nitrate to agricultural accounts. The venture has been quite successful.

The Economics of Copper Development

Smith made it very clear that the economics of copper development are quite different from oil and gas, uranium and coal. Putting a copper mine into production takes an enormous amount of capital outlay and a long period of time. The Hecla mine has been in development for 7 years and is now just starting into production. The capital investment for that mine before any return on investment is 220 million dollars. Smith felt that those kinds of economics make it more difficult to get up-front bonuses in copper agreements, than in energy resources which do not require such a large capital investment.

Rates of return on copper mines are also not as high as oil and gas. Unlike energy resources which are characterized by constantly escalating prices and proportionately increasing demand, copper and many non-fuel minerals are characterized by often extreme fluctuations in price. Currently the copper market is in a slump. Several well defined deposits in the Southwest Arizona Copper Belt are not being developed because the price is so low the project would lose money. The Papago Vekol Mine is in a similar situation. The general concensus now seems to be that until the price of copper goes up to $1.00 - $1.25, there won't be many new mines developed.

The Papago Decision to go into Mining Development

Ten years ago the tribe decided to develop their mineral resources. The decision was motivated by two goals

1. To bring in substantial income to operate the tribal government.

2. To provide jobs on the reservation.

The tribe formed an executive mining committee made up of 4 members of the council and the tribal chairman and vice-chairman. In 1970 Addison Smith was hired to direct the mining program.

The first step taken by the tribe was to block out areas of the reservation and put these areas up for competitive bidding. This entails advertising that the area is available for leasing and requiring that companies bid on the right to explore and possibly develop minerals on the reservation. The highest bidder is given the right to explore and develop the area. The tribes first problem occurred here. There was no evidence of any kind of orebody in the areas and nobody bid. The tribe then developed the strategy to negotiate with companies individually. A process which, unlike competive bidding, requires approval from the Secretary of Interior for each agreement negotiated.

The first step involved in this is the Non-exclusive Prospecting Permit; a walk on permit which allows the company to do geochemical work, and general geology to locate mineral potential. The permit does not allow bulk-sampling, drilling or road building. In the past the tribe has charged $10 for the first four months and $500 a month after that for these permits.

If something of interest is found the company may apply for a Exclusive Prospecting Permit with an option to lease. At this point the tribe will negotiate the lease for the area; this includes the negotiation of a drilling program and the terms of the lease in case they find something.

In all leases and exclusive prospecting permits the tribe trys to get an up-front bonus. The tribe requires work commitments, based on an average basis, to ensure diligent development of the lease.

Smith, in explaining the tribes first experience in negotiations, said, "When we first started to talk to these mining companies, they would come in with 3 lawyers, 2 mining engineers, 4 geologists and 2 CPA's and sit down and have a stack of computer print-outs, about 3 feet thick and put them down on the table and say, "Well, now, according to our tab runs of these discounted cash flow rate of return, the return on this project is such and such and therefore we should have this kind of royalty rate and this kind of commitment," and we'd sit there and say, "Is that right?" We realized that if we're going to talk to these people we better find out what we're talking about.

The tribe has utilized the Bureau of Mines, universities and other sources to assist them in analyzing data on their copper deposit and assist them in understanding the general picture of mining economics. The important point has been reached where "if we don't know the answers we know where to get them." "The important thing," he pointed out," "is that if you really want to sit down and negotiate with these companies, you've got to do it from a position of strength and a position of knowledge."

In terms of achieving the goals outlined by the tribe, Smith felt that once the mines are all producing they will have the funds necessary to operate the tribal government and expand into other ventures. Once the tribe is able to operate its tribal government independently it will no longer be subject to the goals of outside entities such as the BIA.

The tribe has not been very successful in the area of jobs from mining development. In the leases negotiated with the companies it was stipulated that the companies give preferential hiring to Papago people. That, however, does not require them to hire members and they have not done so. The feeling now is that in further agreements the companies should be specifically required to hire and train a specific percentage of Papago people in each job category.

The location of the mine in relation to the Papago population center also creates a problem in regard to jobs. Most people live at least 100 miles from the mine, which creates complex housing and transportation problems.

Problems in Mining Development

The possibility of tribes entering into Joint Venture agreements with mining companies was discussed by Mr. Smith and participants. A joint venture agreement is an arrangement made between companies and the tribe in which the tribe shares in ownership and operation of the venture which it could be liable for any losses incurred if the project failed. If the project was developed at a cost of 300 million dollars and the tribe owned 50% of the operation, would the tribe be then liable for 150 million dollars if the project failed. Bureau of Indian Affairs, Rights Protection Officer and attorney George Crossland expressed the opinion that tribes are protected by sovereign immunity. Mining consultant Steven Zorn pointed out that in many joint venture agreements the company is required to retain all liability and that tribal participation should be based only on the fact that they in fact own the mineral which should insure them participation in the project. (The recently negotiated Navajo-Exxon agreement which has a provision for joint venture specifically states that in the event the mine fails the tribe would have no liability).

Environmental Problems

The major environmental problems associated with copper mining at Papago were stated to be:

1. Open Pit-Mining - Unlike coal mining there is little hope of reclaiming an open-pit copper mine. After 20 or 30 years of development the mine will be a mile wide and half a mile deep. You can't fill that up again. The dumps are also very large and in an arid climate like Arizona, are not very conducive to reclamation.

2. Tailings Ponds - are large areas that hold waste from copper mills. In the copper process the mill concentrates

the .5-1% ore to 27-30% copper; the waste from that process is mixed with water and poured into a tailings pond where the water is allowed to evaporate or is recycled. The remaining waste is a fine powder. After the water evaporates and the mine is closed this waste can be a problem because it is very difficult to reclaim tailings ponds. Nothing can grow there and the fine dust is carried by the wind to the surrounding region creating a potential health problem if people live in the area.

Another danger is that the water within the tailings pond could percolate down and contaminate the underground water table. This is a serious problem in areas like Arizona where there is no surface water. It is important to get baseline data on water quality before the mine starts so it can be properly monitored. It is also important that the tailings ponds be sealed with slimes from the mill effluent or by other means to prevent contamination of the ground water from seepage from the pond.

Water in this part of Arizona generally consists of about 500 parts per million of dissolved solids; the water which enters from the ponds carries approximately 30,000 parts per million which is a major pollutant. Some mines in Arizona which have had 15 or 20 years of mining have done nothing about the situation which could be a major problem.

In negotiations with companies, The Papago Tribe has insisted that the tailings ponds be sealed; that slimes from the mill tailings be placed on the bottom to seal the ground from the water. This is an inexpensive and efficient precaustion.

Oxide copper ores create special problems since it involves an acid leaching process: a process which has greater potential as a pollutant. The tribe has insisted that a separate pond be built in which no water be recycled with the pond sealed. Through-out the state some mines have mixed the sulfide and oxide affluent and recycled it creating some problems.

Monitoring of water is necessary in order to determine if precautions are working. The tribe has insisted that monitoring test wells be set up in front of the ponds to monitor groundwater on a regular basis.

3. Loss of Water - copper mines use immense amounts of water. Copper mining can be estimated to use one ton of water to process one ton of ore. For instance, the Hecla mine plans to pump 4,000 gallons of water per minute (about 3,000 acre feet per year). Because of the scarcity of water the tribe has insisted that the water be recycled through the pond for reuse. Many mines in Arizona do not recycle.

   The question was raised as to if the tribe was charging the companies for the water. It was brought out that the charge is minimal since the tribe is looking to get revenue from higher royalty rates rather than from other areas such as water.

4. Mining Dumps - are the overburden and waste that is removed in getting to the ore. There has been little success in reclaiming these area, although they insist that the companies contour the piles.

Environmental Impact Statements

Under the National Environment Protection Act Environmental Impact Statements are required before any development can begin. Environmental Impact Statements have been mixed blessings for tribes.

For the Papagos it has created a number of problems.

1. Delays in Development - the Vekol Hills EIS has not been completed after 3 years in the system. The Bureau of Indian Affairs has been unable to complete the statement because of lack of adequate staff. In the Phoenix area one person has the responsibility for all EIS's for 33 reservations creating a substantial bottleneck.

2. The Statements Require Public Hearings in Non-Indian cities and areas. The hearings take time and even though these people are not affected by the development they are

allowed to comment. The fact is the tribe is the public and other hearings are unnecessary.

Taxation

The state of Arizona has been taxing mines on the Papago reservation, a 2% severance tax and property taxes. This has amounted to millions of dollars lost by the tribe. While the tribe may be forced to close Sells School District on the reservation because of lack of funds, Pima County has received hundreds of thousands of dollars from the mine to operate its schools.

The taxes have also had a major effect on the tribes royalties because definition of net smelter returns contained in the lease agreement. The taxes are deducted by the company from the returns leaving a lower revenue which a royalty is drawn from. The tribe is planning to go into litigations to end state taxation.

Smith concluded by pointing to the great need for information on mineral resources under one's land. He recommended that the Federal Government help the tribes in two areas:

1. Help tribes find out what they have by either giving the tribes funding to do exploration themselves or having The Bureau of Mines and United States Geological Service help.

2. Provide funds for tribes to hire expertise in the areas of mining economics, environmental problems and mining engineering because the Bureau does not have the expertise in-house and since USGS and BOM do not necessarily advocate the Indian position.

A REGIONAL VIEW - THE CASE OF NORTHERN WISCONSIN*

Al Gedicks, Director of the Center for Alternative Mining Development Policy and Research Coordinator of Community Action on Latin America (CALA), has been active in helping Wisconsin communities develop a positive and active strategy towards control of major mineral development in the Lake Superior region. In his presentation he outlined the current situation of mining development in northern Wisconsin - both the causes behind the move of multinational corporations to the area and several responses which have been or could be made regarding mining development.

The Scope of Potential Mineral Development in the Lake Superior Region

Since 1971, Wisconsin's northern counties have been the scene of intense exploratory operations by every major copper producer on the North American continent. Wisconsin's Department of Local Affairs and Development lists over forty major mining companies that have indicated an interest in the development of Wisconsin' mineral resources. Although the companies have been fairly secretive about the results of their aerial surveys, several major mining and energy companies have already bought or leased land in over a dozen northern counties. Kennecott Copper Corporation has already purchased more than 2600 acres near Ladysmith and has plans for the development of an open pit mine in the near future. The Kennecott discovery has been followed with others by International Nickel, Noranda Exploration Company, Phelps Dodge and Exxon. The copper and zinc deposit discovered by Exxon is believed to be the fifth largest metallic sulphide deposit on the North American continent. The search still goes on for what may be the world's richest and most extensive deposits of copper, nickel, chromite and zinc in northern Wisconsin.

There are several reasons for this exploration boom in northern Wisconsin. First, the area of northern Wisconsin and northeastern Minnesota is underlain by an extension of the Canadian Shield - a massive formation of Precambrian rock which has yielded millions of tons of metallic ores in Canada. John Rigg, former chief of the metal mining division of the U.S. Interior Department, predicted that northern Wisconsin and northeastern Minnesota will be the largest copper and nickel producing areas in the U.S. by the year 2000.

A second major factor contributing to the interest in Wisconsin's mineral resources has been the steadily mounting pressure on U.S. mining corporations by countries in the Third World seeking greater control over their natural resources. With the partial or total nationalization of U.S. owned mineral industries in Third World countries these corporations are placing increased emphasis upon the development of mineral resources in the U.S. and in other "secure" areas of the world such as Puerto Rico, Panama, the Phillipines, Canada and Australia.

Finally, more sophisticated survey techniques have been developed which help pinpoint resources and technological breakthroughs in open pit mining have made it possible to dig deeper and faster than ever before. Until quite recently, the geology of northern Wisconsin was totally unknown because of the earth and stone that glaciers heaped to depths of 300 feet over the bedrock.

Clearly, the dimensions of the present exploration boom suggest that the Kennecott venture in Rusk County, while it may be the first, will not be the last such mining venture. The same factors which have motivated the exploration boom in Wisconsin have resulted in similar booms in northeastern Minnesota and the Upper Peninsula of Michigan. In northern Michigan, International Nickel and the Tennessee Valley Authority have already bought mineral rights for 200,000 acres of land which are expected to yield vast deposits of copper, nickel, zinc and possibly uranium. American Metal Climax (AMAX) and International Nickel (INCO) are preparing environmental impact statements for large scale copper-nickel mining in northeastern Minnesota. And finally, the Sea Grant programs at the Universities of Wisconsin and Michigan are developing the technology for mining on the bottom of Lake Superior. The impact of present and future mining development will not be limited to particular mine sites or even portions of some states; the impact will encompass the entire tri-state region of northern Wisconsin, Michigan and Minnesota.

Despite the enormous economic, social, political and environmental impacts of large scale mining development, there has been relatively little public discussion or debate about these impacts. The attempt has been made by the private mining corporations and state government to focus attention on each individual mining project in isolation from the overall impact of large scale mining development. Thus when Kennecott announced the discovery of the Ladysmith deposit Kennecott officials emphasized that this was an isolated deposit and that the small mine would have minimal economic and environmental impacts. From Kennecott's point of view, this was a "marginal" deposit. Kennecott failed to point out that the deposit was extremely valuable (containing 4%-6% copper ore content) and that the deposit was part of a larger geologic formation that would probably yield other rich deposits of copper, nickel and zinc. In 1975, Kennecott bought land about a mile from the Ladysmith discovery with the understanding that a similar mine could be developed there. In 1976 International Nickel bought land in the vicinity of the Ladysmith mine and has plans to do more extensive on-site drilling to determine the feasibility of copper mining.

As previously mentioned, the advances in geophysics and exploration technology have taken much of the risk out of exploration for the mining companies. In addition, the mining companies are subsidized at taxpayer expense through grants from the Upper Great Lakes Regional Commission, an agency originally set up to rehabilitate northern Wisconsin as a result of the collapse of the iron mining boom in the 1950's. In just one year, the Upper Great Lakes Regional Commission awarded private mining companies $22,400 to support the exploration for minerals by using aero-magnetic mapping as opposed to more expensive on-site drilling.

Despite the fact that public funds are being allocated to the corporations to obtain this information, the results of aero-magnetic surveys remain the "privileged" information of the private mining corporations. Because individual landowners do not have jurisdiction over air space, the mining companies have been able to do their own aero-magnetic mapping without obtaining the consent of the landowner or without being required to share whatever information the companies learn from their survey. On at least one occasion, Kennecott's Bear Creek Exploration Company used their low flying aerial survey plane as a means to harass a landowner in Marathon Country who refused to grant the company drilling rights on his land.

When the mining corporations do approach individual landowners for on-site exploration and drilling rights, the company knows full well the value of what they are looking for but the individual landowner in an area to sign a contract granting the company the right to buy out the landowner if any minerals are found, the companies can then play off one landowner against another in an attempt to buy out entire tracts of land. This is precisely the strategy that was pursued by Exxon when confronted by the resistance of the Mole Lake Chippewa tribe regarding mineral development on the reservation. Exxon simply offered white landowners two million dollars for a forty acre tract of land near the reservation. In this way, Exxon can put considerable pressure on the tribe to come to some agreement on mineral development on the reservation. If the tribe still refuses, Exxon simply goes ahead with mining and digs up the earth right up to the border of the reservation.

Alternative Scenarios on How Mining Development Could Take Place in the Region

Active Strategies

1. Tribes can deal with the situation individually or through inter-tribal groups.

2. There can be a strategic alliance between Indian communities and white communities.

Passive Strategy

3. There can be a re-colonization of the entire tri-state area by multinational natural resource corporations in conjunction with state governments.

If tribes choose to approach the situation alone or with inter-tribal organizations they may be able to control the impact and benefits within the reservation boundaries but they may be unable to have any influence on the overall effect of mining development in the entire region. Mining can have a major environmental effect on the water system, vegatation and timber of a large area surrounding the mine thus affecting tribal economic activities such as cultivation of wild rice, agriculture and forestry.

A flow of information and analysis both within Indian communities and between Indian communities and white communities in similar circumstances is essential here. The communication of the results of various strategies different communities have taken towards mining companies and mining development could help tribes avoid many of the pitfalls that others have experienced. On a more positive note, the efforts of the Northern Cheyenne tribe to get the U.S. Environmental Protection Agency to reclassify the air quality on the reservation in Lame Deer, Montana to a higher quality is an important precedent for other communities - Indian and non-Indian - who are being surrounded by mining companies eager to mine precious minerals or fuels. If the Northern Cheyenne tribe is successful in their attempt to get the air on the reservation classified at a higher level than surrounding communities then the tribe will have a legal weapon with which to oppose coal development near the reservation which could pollute air on the reservation. Up until this recent development mining companies have been able to reject proposed agreements by tribes as long as they were able to get away with inferior agreements on non-Indian lands. This could also change if non-Indian communities became aware of the increased economic benefits they could receive under different types of mining agreements.

The scenario that is being orchestrated by the mining companies in cooperation with the three state governments is Wisconsin Governor Lucey's Upper Midwest Regional Development Plan which would set the stage for the development of the region as a mineral exporting region without linkage between the needs of the local economy and the needs of the multinational corporate economy. As previously mentioned, the Upper Great Lakes Regional Commission is one of the principal state agencies providing support to the mining companies through exploration grants and through the direct and indirect support of projects which provide the necessary infrastructure for large scale mining development - communications, transportation systems, electrical generating facilities, processing facilities, labor, etc. Part of the scientific and technical support for this plan comes from the Rockefeller Foundation supported Lake Superior Project at the University of Wisconsin and the previously mentioned Sea Grant Program of the Institute for Environmental Studies at the University of Wisconsin.

What is at Stake?

For the multinational natural resource corporations these reserves of precious minerals represent a source of enormous profits that will at once allow them to reverse some of the setbacks they have received at the hands of economic nationalists in the Third World and at the same time tighten their grip over their control of the world's remaining resources. For the people of northern Wisconsin the development of these non-renewable natural resources represents a series of potential economic and environmental disasters that will affect a far greater number of people over a wider geographical area than any previous mining development in the state.

To gain some perspective on this potential social and environmental disaster one has only to remember that the present poverty of northern Wisconsin ranks second only to Appalachia, a point underscored in Governor Patrick Lucey's plea for aid to this area from the federal government.

In order to get the American public to go along with the plans of the multinational natural resource corporations to rip up the land for private profit, the companies are spending millions of dollars to try and tell us that raw materials are going to be in short supply and that prices will have to rise to encourage new investment. John Kyl, Assistant Secretary of the Interior Department, warned in 1974 that the U.S. was heading into a minerals and materials crisis that will make the fuel crisis look like a Sunday school picnic.

But what Kyl did not mention was that if such a crisis does come about it will not be due to any alleged "shortages" in raw materials, but rather, it will be due to the monopolization of the world's ramaining resources by a handful of multinational natural resource corporations who will then be in a position to dictate prices in order to keep profits high.

There is an already alarming trend of oil and natural gas companies to diversify into copper mining either through new investments or by acquiring existing copper companies. Exxon's move into copper mining in Forest County, Wisconsin is an example of the former and Atlantic Richfield's takeover of the Anaconda Copper Corporation is an example of the latter.

In addition to diversification across industries, these same companies are vertically-integrated; i.e. they control the ore from the mine to the mill to the smelter to the final customer of the product. Because the corporation already has its own network of plants and affiliated companies supplying inputs into the operation, there is little or no likelihood that the company would choose to locate these auxiliary facilities at the site of the mine where the local community would stand to benefit from the additional jobs and tax revenues that would be generated.

The competitive position of these multinational natural resource corporations is further bolstered on the world market by the control of as many potential mineral deposits as possible in order to influence production, pricing and marketing policies. Thus the importance of Wisconsin to the multinational natural resource corporations may not lie in the immediate prospect for copper mining but for reserves at some future date. The companies not only restrict production at mines already in operation; they also seek to gain control over potential unexploited reserves and, more importantly, to prevent others from exploiting them. Such uncertainties cannot be tolerated by these world-embracing corporations.

A leading British economist, Keith Griffin, found that "for many years the Anaconda Company has claimed the mineral rights to huge tracts of land in Chile. Most of this terrain has never been explored and none of it has been exploited. Anaconda has simply kept this land as potential reserve, maintaining her monopolistic position and preventing others from developing the possible mineral resources located there..." The result is that large areas of land are taken out of use for other economic development purposes and the entire region suffers from lack of economic activity.

Also at stake is the possible environmental devastation of the area. Throughout the history of copper mining, environmental destruction has been closely associated with extraction and refinement of the ores, especially when the deposits contain sulfides, as is the case in northern Wisconsin. If the multinational natural resource corporations proceed with copper mining in northern Wisconsin, millions of tons of water will be used in processing and concentrating the ores. Runoff and seepage from tailings ponds, waste dumps, ore dumps and stockpile areas often are heavily contaminated with pollutants.

Studies that have been done in Canada indicate that 20 to 25 chemicals are present in trace quantities in the effluent of most copper sulfide mining operations, and are capable of killing aquatic life. Many of these chemicals, including copper itself, are poisonous to fish at part per-billion levels. The conclusion of a recent study on water quality and copper-nickel mining by the Minnesota Public Interest Research Group was that "in an area with closely connected waterways, such as northeastern Minnesota, toxic discharges into one lake or river can quickly poison an entire watershed." (Excerpts from the study are contained in Appendix A of this report).

Community Response - After the Impacts are Assessed

The development of the Kennecott mine in Rusk Country was conceived of as a new model of how the mining industry could win over potential mining communities by careful attention to public relations and careful control of the flow of information about mining impacts. The initial fears that some people expressed about environmental damage were seen as unjustified as long as the Wisconsin Department of Natural Resources had responsibility for seeing that the company complied with state air and water quality standards.

But the careful public relations program of Kennecott began to break down very soon after Kennecott used its enormous political power to push through a "giveaway" mining taxation bill in the last days of the 1974 state lesiglature. The taxation bill, which was drafted by Kennecott and approved by the State Department of Revenue, was referred to by one veteran lesislator as "one of the worst snow jobs ever put on in this house." An economist for the Institute for Environmental Studies at the University of Wisconsin caluclated that if Kennecott were to mine an ore body in Arizona identical to the one in Rusk Country, Wisconsin, Kennecott would be paying three times the taxes. Meanwhile, in Wisconsin, the amount of taxes that would be returned to the local community where the mining took place would be just enough to pay the salary of one new schoolteacher for the additional children who would be using public facilities as a result of mining activity. At the same time, Kennecott's after tax profits are conservatively estimated estimated at $5 million annually for at least 11 years of open pit mining operations.

While the inequities of the mining taxation bill aroused the suspicion of Rusk County citizens, the rubber-stamping of Kennecott's own environmental impact statement by the Wisconsin Department of Natural Resources propelled them into action. Formed in March of 1976, the Rusk County Citizens Action Group has been working to halt the proposed Kennecott copper mine until adequate assurances are given that the community will be protected from environmental destruction and will receive a greater share of the benefits from the mine.

Today, the citizens of Forest County (where the Exxon-Crandon discovery is located) are very much in the same position that Rusk County citizens were five years ago. The white residents believe everything that Exxon tells them about all the benefits they will receive from mining. Few people have bothered to investigate what the costs to the community will be. The Forest County board of supervisors has gone so far as to hire a former Kennecott geologist as their advisor on mineral agreements with Exxon.

Environmental groups in Wisconsin, such as the Wisconsin Conservation Congress and the Environmental Agenda Coalition, have been active in trying to counter the lobbying efforts of the mining companies on the state legislature. While these environmental groups have begun to mobilize public opinion in favor of tough environmental legislation, the mining companies have been pouring large sums of money into trying to kill any progressive legislation before it is reported out of committees. Exxon alone is spending $1 million per year on lobbying to kill progressive tax and environmental bills. One of the most important pieces of environmental legislation would require companies to file regional environmental impact statements which spell out the consequences of mining on the entire region rather than just the mining site. Such a regional impact statement would give citizens a better idea of the costs and benefits of such large scale mining development.

In the concluding question and answer period of Gedicks's presentation, it was brought out that the process of decision-making was very different in the non-Indian communities in Forest County and the Indian community. In the non-Indian communities the decisions about leasing and selling land to Exxon were decisions by individual landowners without regard to the impact of mining on the rest of the community. This has not been true of the Mole Lake Chippewa tribe. The tribe has made a point of educating tribal members on the impact of mining and has refused to negotiate any agreements with mining companies which would not benefit the tribe as a whole. The Mole Lake Chippewas have provided a model of genuine community decision-making for other communities which are confronted with the possibility of mining development.

A BUREAU OF INDIAN AFFAIRS VIEW

George Crossland, Bureau of Indian Affairs Rights Protection Officer, is a prominent figure in the area of Indian water rights.

The Bureau of Indian Affairs, as trustee, has the responsibility to insure that Indian Nations receive the best deals possible in mining agreements, that the impacts of development are minimized and that Indian rights are protected.

The Bureau has been hampered in its attempts to fullfill this trust responsibility. The major problems have been:

1. Lack of Funding: There has been inadequate emphasis in the budgeting process on economic development and rights protection, two areas which will ultimately determine whether or not Indian nations can survives as political and cultural units. Without economic self-reliance it is doubtful whether there will be Indian nations in the future. To change this situation there needs to be a major lobbying effort by the tribes and the Bureau to get congress to increase funding to adequate levels. Also needed is a major effort to have the BIA budget taken out of the Office of Management and Budget Process (OMB). Bureau trust responsibilities are legal obligations, bound by treaty, which should not be subordinated to the political goals of a particular administration.

2. There is a lack of expertise within the Bureau to properly advise tribes. There are too few people and even fewer qualified people within the Bureau to adequately evulate projects and provide advice to Indian nations considering multi-million dollar projects.

3. The Bureau, in general, lacks the self-interest to be fully concerned with the implications of actions. Not that there is malice or negligence on the part of employees but rather you can't really expect an outside entity to assume self-interest in actions they never profit from or suffer from. Only tribal leaders will be accountable to the future generations of the tribes. Members of the tribe will be the ones who will ultimetely suffer from or benefit from decisions. For that reason tribal leaders should themselves negotiate their own contracts and make the basic decisions which will affect their people. The Bureau's role should be supportive.

Support service which the Bureau has the responsibility to offer include:

a. Funding: So that tribes can hire their own negotiators, attorneys, economists and geologist. A small investment in expertise will pay off a hundred fold with increased revenues and greater Indian control.

b. Data Gathering: utilizing the United States Geological Survey and the Bureau of Mines, necessary information on mineral reserves, water availability, development impacts and other areas can be accumulated and given to tribal decision-makers so they can make informed decisions.

c. Rights Protection: Three areas are of primary concern:

1. Protection of Indian tax status: as tribes begin to develop their extensive mineral resource one can expect an intensified effort on the part of states to try to tax income earned from mining. That situation threatens to extremely limit the income tribes would earn.

   Tribes are legally immune from taxation if they realize income from trust land. That is a right tribes retained when they gave up vast areas of land to the U.S. government. There needs to be a major effort on the part of the Bureau and the tribes to retain that right.

2. Protection of Indian Water Rights: Since mining activities use a great deal of water it will be necessary to insure that enough water will be available for mining, agricultural, and domestic use.

3. Protection of Information on Indian Resources: States have taken the BIA to court in an attempt to get information on Indian water availability and on natural resources. This information is the private property of the tribe and the determinations as to who the information goes to should be the decision of the tribe. The Bureau has taken the position that under no conditions will any information be released.

TRUST RESPONSIBILITY AND SELF-DETERMINATION

The extent to which the Bureau can relinquish its trust status to the tribe without the tribe giving up its trust status is a nebulous area. The Bureau must be able to demonstrate that it is exercising trust responsibility by reviewing mining projects and policies.

Exercising this responsibility would do two things. It would prove that tribes still have trust status since we are exercising trust responsibility. Trust immunities and rights would be preserved. In addition, it would provide for a second opinion on the viability of the project. Trust responsibility should not be a mandate for slowling down development plans, nor should the trustee second-guess the tribe. Instead the intent should be to re-evaluate the plan and inform the tribe of any loopholes or problems.

THE THREAT TO INDIAN SOVEREIGNTY

Over the past two years there has been a major political move by white vigilante groups to terminate tribal governments. So called Civil Rights Groups such as the Interstate Congress for Equal Rights and Responsibilities have been organizing non-Indians living on or near reservations in Montana, South Dakota, North Dakota, Utah, Arizona, New Mexico, Minnesota, Washington, and Wisconsin.

The groups are exerting pressure on Congress, the administration and the media to take away Indian jurisdiction and other sovereign rights. They are articulate, well-organized and well funded with good connection in all aspects of governments.

These groups have argued:

(1) that Indian treaty rights should be superceded by non-Indian constitutional rights.

(2) that Indian reservations should not be enlarged by boundary changes, by grants, or by powers of eminent domain.

(3) that Indian tribes should not have jurisdiction over non-Indians who live on Indian reservations.

(4) that members of Indian tribes should not have the right to participate in non-tribal government.

Although these organizations are powerful and well-funded, the facts behind their arguments are either misleading or fabricated. Tribes should attack the credability of these people. Major efforts should be made to expose them publically and fight them in congress but one must not underestimate them.

BEFORE YOU DEVELOP: MEASURING THE IMPACTS

Jack White, Assistant Director of the Science and Public Policy Program, Project Director of the Integrated Assessment Program and Professor of Political Science at the University of Oklahoma, has been involved in a research program formed to identify environmental, social, and economic alternatives for western Energy Development. The methodology he has used to approach this problem is quite relevant to non-fuel mineral development.

Technology Assessment

When Indian policy makers are faced with the possibility of mining development on their land it is essential that they have the best information available and the best understanding of the kinds of alternatives and problems they are dealing with. Technology Assessment provides a method of organizing information, defining alternatives, and implementing decisions.

Technology assessment has been developed in order to simplify the enormous amount of information that bombards policy-makers and make their tasks more manageable.

For the purpose of this report the issue of introducing mining technology to an Indian reservation will be examined in very general terms.

The first phase in assessing mining technology is called the descriptive phase. Developing a mining project necessitates the use of many different kinds of technologies in various stages of the project.

1. Exploration for the mineral
2. Construction of the mine and
3. Operation of the mine.

All of the alternative technologies which could be used will require inputs: water for processing, money, labor, equipment, and electrical power. Use of the technology will result in outputs such as air pollution, water pollution, noise, etc.

The first step in the descriptive phase is to identify and describe the technology used looking specifically at what the input requirements are (how much water, electricity, manpower is needed? What kind?) what the outputs will be (what kind of air and water pollution will there be? how much?) and what kind of controls the tribe has to deal with the inputs and outputs.

The description of the technology should include all of the alternatives for exploration, mining, and processing for the particular mineral in question.

Then the kinds and amounts of input materials and output material for each alternative technology should be outlined.

The second step would be to describe the conditions where the technology will be used. Conditions including:

1. Water quality
2. Water quantity
3. Air quality
4. Capital available
5. Climate
6. Ecology
7. Economic Activity
8. Governmental Systems
9. Electric Power Availability
10. Traditional patters of life.
11. Unemployment
12. Topography
13. Land use pattern, and so on.

The goal of the descriptive phase is to determine the conditions that presently exist (baseline data) so that the effects of a particular technology introduced into those particular conditions at a specific location can be assessed.

The next phase in Technology Assessment is the interactive phase or impact analysis. Impact analysis is predicting the consequences of a technology on a specific area.

The first step would be to determine the changes likely to occur when a mining technology is constructed, operated, and shut down at a specific location. For instance, changes in:

1. Air Quality
2. Water Quality
3. Water Availability
4. Land Use
5. Population
6. Income Levels

In this phase, one would analyze how each alternative technology would affect conditions in a specific area.

The next step would be to determine what the consequences of the changes would be, consequences such as:

1. Human health
2. Quality of life
3. Traditional lifestyles
4. Standard of living

For example, if you have identified in the descriptive phase two types of copper mining technologies, one which needs less capital but requires large quantities of water and one which needs more capital but less quantity of water and the two technologies are proposed in an arid area with little water, the changes in existing conditions would be different under both technologies. In the former case, you may find that in the use of the water intensive technology there would be less water available for agriculture and land use patterns would be changed. In the latter case, you would need more capital to operate the mine and incomes would not increase as much. The consequences of these technologies could be changes in traditional lifestyles in the former case since agricultural activity would decrease; and in the later case the standard of living may be less improved.

The third phase in technology assessment would be the integrative phase or policy analysis.

The first step would be to identify and define the problems and issues brought to attention by the impact analysis and develop policy making systems to address these problems and issues.

The second step would be to identify and describe alternatives and strategies to deal with the impacts.

These could include:

1. Examing alternative technologies to determine which one would best fit the goals of the tribe. If preservation of traditional lifestyles are important and agriculture is necessary for preservation in arid areas, one would choose a mining technology which uses less water.

2. Determine what kinds of regulations are needed by the tribe to limit negative impact.

3. Analyze what kind of trade-offs may need to be made to insure that tribal goals are met.

The third step would be to identify any possible constraints which may interfere with achieving the tribes goals. Constraints could be:

1. Legal
2. Political
3. Social
4. Cultural
5. Economic
6. Technological

We are all governed by limitations and constraints although few of us could speak authoritatively on many of the matter mentioned above.

Most of the areas of constraint shown here are highly specialized areas which may require the advise of outside experts or consultants. Under taking such a major development without proper advice would be extremely unwise and would most likely result in failure.

Know Your Advisors

When such a mining project is proposed it necessitates the use of many different types of technologies and the talents of individuals who possess expertise in these areas. The only way you can understand the full implications regarding the choices you must make is through your own analysis of the reports and opinions of these experts.

Experts or persons experienced in areas which are unknown or are "grey" areas for tribal members can offer an invaluable service for the tribe. However, as in all professions, there are experts and there are "experts".

Before the tribe accepts the work oa a consultant or advisor for a specific technology; his background should be fully investigated to determine his actual formal education, practical work experience, and previous consulting experience in this area. If possible, efforts should be made to contact previous clients to determine their reactions to the value of his advise; if all factors were considered, general reaction, etc.

Important to remember is that white, city-bred executives often consider profit over impact. Selecting a consultant who understands the necessity and desire to protect and maintain Indian culture and environment is essential. Without this basic understanding the two parties will be working toward different goals.

Another matter for consideration is the language or communications matter. If the advisor uses such technological or ambigious terms and language as to not be readily understood by the layman, then the information provided cannot have full impact and may in fact prove useless.

It is wise to be cautious about your advisors. There are many experts and advisors around--some of whom are experienced and are prepared to give their time and advice on a set fee for time basis, while others will try to negotiate for a "share" of the profits or a "royalty". Don't give up any interests in anything to anybody. Agree upon a set fee and stick with this. Remember, if a share or royalty looks better to the advisor, there must be a reason. This reason is usually greed. These profits rightfully belong to the tribe and should stay there.

One last factor for consideration would be the matter of sharing. This acquired information and knowledge can only reach its full potential and produce the desired return if it is shared with all tribal members. Too often, secrecy is practiced among decision-makers and all that is accomplished is the construction of a wall of resentment and mistrust. Also, there is no feedback from tribal members, so decision-makers really don't know what action the tribe wants. These matters are best handled in open discussions at group meetings where all facts, impacts and alternatives can be brought to light and debated. This sharing of information will lead to more cooperative and congenial relations making the tasks of the decision-makers simpler and more meaningful as he will be able to choose what is best for the tribe based on a majority view-point of the tribe.

DEALING WITH DEVELOPERS

Charles Lipton, International Attorney and negotiator, has represented 22 overseas nations and 4 Indian nations in natural resource negotiations. Lipton has served as an advisor to the United Nations and teaches law at New York University.

"I have advised many developing countries on natural resource agreements. The Indian leases in this country are among the worst that I have seen: they can only be compared to the old colonial agreements of thirty or more years ago." Charles Lipton

Dealing with Developers

The Federal lease form, the standard form of lease agreement used on Indian lands is a lease which gives tribes as little as possible in terms of financial returns and no control whatsoever over the development of their resources. These deals are so extraordinary that you begin to wonder who the Bureau of Indian Affairs is protecting, the tribes or the those companies who wish to exploit the resources of the tribe. Many of the leases that have been signed clearly don't indicate they're protecting the tribe.

Look at the Northern Cheyenne Coal lease, where a speculator, a Billings lawyer, for some reason unbeknown to the tribe, succeeded in getting a coal lease over a great deal of land. Without spending one dime, he turned around six months later and assigned it to a coal company. The tribe didn't have a thing to say about the assignment. Under the Standard Indian Lease Form the tribe doesn't. It's strictly a matter between the Bureau of Indian Affairs and the lessee. The speculator assigned the lease to Chevron for which he received $1,380,749.50 while the tribe did not receive one penny. In addition his descendents will receive 9¢ per ton royalty, more than half of what the tribe gets for each ton of coal mined.

Another tribe had entered into a coal lease where all they get is a fixed royalty of 17½¢ per ton, without any relationship to what kind of coal it is - how high the grade, or how low the sulfur content--and more important without any relationship to the value of the coal. When coal prices go up, the tribe won't get anything more; the lessee gets it all. We all know what has happened to the purchasing power of the dollar in the last few years; 17½¢ will buy only half an ice-cream cone today. What will it buy in five year time?

The federal lease form has been routinely used for public lands and for Indian lands under federal trusteeships. The problem is that Indian land is not public land. What is good for the federal government is not necessarily good for the tribe.

The federal government is going to get its financial return not only from the lease itself but also from taxing the profits made by companies using the raw materials from the federal lands. The federal government also has some interest in subsidizing the needs of the country as a whole--energy, for instance. Leasing coal owned by the public for 17½¢ per ton can also be rationalized on the basis that cheap energy is badly needed, that the companies developing coal deposits will pay taxes on their profits to the federal government. Leasing tribal coal at the same terms cannot be rationalized that way. There can be no justification for some of the poorest people in the country subsidizing the needs of the rest of the country, much less the wealthy multinational corporations. Nor can the failure of the Tribes to get a fair share of the profits from their natural resources be justified. Ironically leases on public lands have been shown to provide for better royalties than those on Indian lands.

Worst of all, under the federal lease form, the tribes have no control over the development of their resources.

Control means who makes the basic decisions regarding a project. It is very important that before negotiations are undertaken, the basic decisions are identified and a determination is made as to who will make them. For instance, with timber, tribal' governments may determine what the annual cut will be, the reforesttation cycle, the species of wood to be grown, etc. with minerals they may determine how much mining there will be and where; at what rate; what factories are going to built, if any; where they are to be located, how and when the land will be restored, etc. They may decide to what extent the raw materials will be processed before it passes from their control. Timber may be cut; a saw may be established; a chipping plant; pump and paper mill; a plywood plant; veneer plant; furniture factory. The more you upgrade, the more you add to the value, the more you add to the deal in terms of money, jobs and the "Multiplier Effect" - the creation of new local services, small business and feeder enterprises.

Tribal Governments may set conservation standards, environmental standards, training programs and employment and promotion quotas. Developing countries no longer settle for "employment preference" clauses. They set out schedules, for instances, that after five years 90% of the employees in each job category will be local people; in ten years 100% except for certain specified jobs.

They don't accept a clause that provides for employment of local people only "if qualified people are available." The developer must qualify them. There may be a requirement that for every ten outsiders, one local person will be sent to school; or for every five outsiders, one local person will be put in a training program. Tribal Governments may decide where housing projects will be built and how they will be built. Many don't go this far yet. But they will. That is what control is about.

Tribes are at a particular disadvantage because they have no idea of real value of what they are leasing. No matter what form of agreement is it, basically its a sales contract. The minerals copper, nickel, phosphate, uranium or coal, are going to be taken out of the ground and the tribe is going to be parting with a non-renewable resource. It is a sales contract, yet the Bureau of Indian Affairs as trustee routinely approves these sales contracts without knowing the value of what is being sold. Even now, tribes are still entering into resource sales contracts without having any ideas of what is worth.

In developing countries agreements are made with the assistance and advice of geologists, mining engineers and mining economists who all are able to work with a good idea of what's in the ground. They are able to come to the bargaining table knowing what's in the ground, it's value, the quality and grade of the ore how much it would cost to mine and what the projected selling price of the mineral will be over the next 20 years. When the tribes come to the bargaining table they have nothing. How can the Secretary of Interior discharge its trust responsibility to the tribe unless this information is made available. The federal government has the capability and expertise to provide the tribes with needed information. In fact, the U.S. Geological Survey is currently doing a mineral inventory for the Government of Saudi Arabia. For the federal government to have the expertise and not use it for the tribe is a flagrant abuse of its trust responsibilities to Indian Nations.

Royalties

In the past, most Indian minerals lease have consisted of a flat royalty rate; a certain number of fixed cents per ton no matter at what price the mineral is sold. Leases have been getting more sophisticated. Now it is a percentage royalty or a graduated percentage royalty. In a percentage royalty the mineral owner receives a fixed percentage of the sales price of the mineral. If the mineral is sold at $10 per ton, the owner would receive $1, if the mineral was sold at $20 per ton, they would receive $2. Another kind of percentage royalty is the escalating percentage royalty. The excalating royalty would work like this (see table 1-c). Assuming that the cost of production is $6 per ton and the capital cost .50 per ton; with a 10% royalty and a $10 sales price the tribe would receive $1.00 per ton and the company $2.50 per ton in profits. If the price would go up to $50 per ton, the tribes royalty would increase to 16% or $9.00 per ton in profits but the company would receive $35.50. Looking at table 1, one can see that their isn't a great deal of differences between any of the 3 systems. Under all three, the tribe would be receiving between $1 and $9 per ton in royalties while the company would be receiving between $35.50 and $42.50 in profits. The royalty gives the tribe some income from the mining development but in no real way does it provide for a share of the profits. The increased profits the company receives from higher prices are not made because of any of the efforts of the company. They are rather, a function of the value of the mineral of which the tribe is the owner. It is a function of what's in the ground and what is being produced and what the economy is going to take in any given period of time. Any kind of royalty does not take into consideration the value of the mineral and consequently the mineral owner does not share in the profits created by the value of their mineral.

The royalty should be the minimum guaranteed return to the tribe. It should be the starting point of the tribe in negotiations. Going on from there is the question of how do we share in the profits that are made because the value of the mineral has increased.

One way of sharing the profits is with the joint venture arrangement A joint venture provides that the profits will be split between the company and the mineral owner, according to a predefined formula, the joint venture is in fact a partnership. The company will provide the capital, the technology, the management, and the marketing skills. The tribe is going to provide the one thing which is essential to the operation - the mineral. There's no show without that. The basic value belongs to the tribe, the tribe should receive a share of the profit. Most joint ventures insure that the mineral owners receive their financial share in three ways.

Table 1*

Sales Price	Cost of Production**	Capital Cost	Tribes profits	Company profits
a. Flat Royalty ($1.00 per ton)				
$10	$6	.50	1.00	2.50
$20	$6	.50	1.00	12.50
$30	$6	.50	1.00	22.50
$40	$6	.50	1.00	32.50
$50	$6	.50	1.00	42.50
b. Percentage Royalty (10% of sales price)				
$10	6	.50	1.00	2.50
$20	6	.50	2.00	11.50
$30	6	.50	3.00	20.50
$40	6	.50	4.00	29.50
$50	6	.50	5.00	38.50
c. Escaleting Royalty (10% to 16%)				
$10 - 10%	6	.50	1.00	2.50
$20 - 12%	6	.50	2.40	11.10
$30 - 14%	6	.50	4.20	19.30
$40 - 16%	6	.50	6.40	27.10
$50 - 18%	6	.50	9.00	35.50

*The figures used in table 1 are hypothetical and do not necessarily represent a common royalty rate (generally royalty rates are lower).

**The effect of inflation on costs of production is ignored - inflation would account for some of the increase in price and would therefor affect the costs of production although probably by not more than 30¢ - 50¢ per year.

a. They collect a royalty which is not fixed in cents per ton or tree cut; the royalty is a percentage of the market value. This guarantees a cash flow, whether projects prove to be profitable or not, and insures that the payment is in proportion to the value and will increase if inflation raises the value of the resources. It also insures that the owner, the tribe is compensated for their costs: Loss of a non-replenishable resource, negative affects of mining development and its administrative costs involved in the project.

b. They collect their own profits tax; and their auditors make that calculation.

c. They obtain a participation in the net profits.

The joint venture also should assure that the mineral owner has some say in the operation and management of the venture. They will have people on the board of directors and will be able to specify in the agreements what the company can or cannot do without the specific approval of the mineral owner.

Joint venture arrangement should not require that the mineral owner buy into the operation. There is no reason that they should have to buy shares in the company in order to share in the profits. The mineral owner should get those share in exchange for the right to mine. The value of the mineral which the tribe owns should be what is traded for shares in the operation.

Joint venture arrangements also should not require the owner to put up exploration money. That is what the company is in the business of doing. Large corporations can afford to undertake exploration risks with the expectation that if any one out of ten exploration efforts are profitable they will earn enough money in one to cover the exploration costs of the other nine. Such a wide diversification of projects may not be possible for tribes.

Another way profits can be shared is with the Production Sharing Agreement. The production sharing agreement is a variation of the joint venture. The owner's take is in-kind rather than in a percentage of profits, like a share cropping arrangement. The owners can then market their share themselves. This works well for certain resources like petroleum, timber, or gold; often to the advantage of the owners because you can't be sure that developers are selling to the best advantage. They may be selling at reduced rates to their own subsidiaries or to others who will reciprocate. This could make the profits lower and thus the owner's share lower.

The problem that lies with both the joint venture and the production sharing agreement is with State taxation.

Some states have, thus far, been successful in levying a severance on Indian owned minerals when it is leased or when a property interest is transferred. In a joint venture arrangement the tribe must lease mineral rights to the joint venture company. In a production sharing agreement, it be argued that the company has a property right in recovering its cost and earning its share of the profits thus involving a transfer of property interest. The effect of a severance tax can be quite profound. One should consider the possible effects of state severance tax before structuring any mineral agreement. Even if the state does not currently have a severance tax the odds are that they will soon. In the situation of a royalty agreement in the state of Montana, if the price of coal is $9, and the State of Montana has a 30% severance tax and the tribe collects an 8% royalty you have a situation where the state gets $2.70 a ton and the tribe 72¢ a ton. The state gets $2 a ton more than the state even though the tribe owns the coal.

One solution to the problem of state taxation is the service contract, an arrangement which has been worked in a number of countries throughout the world and which the Crow tribe is now investigating. In the service contract the tribe, the mineral owner, owns the mining venture and mines it themselves. The tribe owns and controls the venture in its entireity.

The tribal mining authority, or the mining company, would contract with another mining company to extract the mineral for a fee. This is similar to employing a contractor to build a road or building. The fee could be a percentage of the value of what's produced, a percentage of the profits, or a fixed dollar amount. Similarly the same company or a different company can be hired to market the minerals on a commission basis. The tribe itself could have the opportunity to market their own minerals.

Under the service contract there would be no basis for taxing. The venture would be entirely tribally owned and tribally owned ventures cannot be taxed.

The effect is extremely significant. Since a severance tax is based on total revenue rather than profits that would mean that under any kind of arrangement where there is state taxation the state could be getting most of the profits. Without the tax those profits should go the tribe.

The service contract offers maximum return and maximum control to the tribe. The tribe specificies exactly how the mining is going to take place and how it is going to be carried out.

Another possible method of eliminating destructive state taxes is for the tribe to pre-empt the state severance tax with their own tax. For instance in Montana, where the State has a 30% severance tax, the tribe could institute a 30% tax of its own and argue that state taxes would be dual and unfair taxation. What could happen would be a sort of excalation where the State could raise its tax to 35% and it would still get 5% (the tribes tax of 30% would preempt all but 5% of the states tax.)

The advantage of the service contract over another form of agreement which includes a premptive tax would be that the service contract would give the tribe greater control over operations and a greater financial return.

Currently the Crow Tribe and American Metal Climax corporation are negotiating a service contract which could very well end up being a model which other tribes could look to. The success or failure of the negotiations and the reactions of state and federal government to the arrangement will offer valuable information to all tribes considering mineral development.

DEVELOPING MINING POLICIES

Steve Zorn, natural resources consultant and editor of Copper Studies, has served as an advisor to the government of Papua, New Guinea in the area of mining policy and natural resources negotiations.

When Papua New Guinea got its independence in 1975, the first area where government policy was established was in mineral development. One of the largest open-pit copper mines in the world was already operating at the time of independence and from that one mine the nation was the seventh largest exporter of copper in the world.

What Do You Want Out of Mining Development?

The new government made a very concious attempt to ask what the people of Papua New Guinea wanted out of mining development. They decided to outline a process where the goals of the people can be implemented and defended.

The first step in that process was to determine what the nation's economic goals were in general. The nation's decision-makers decided that what they wanted was self-reliance, so they would not have to depend on the colonial power for 70% of their budget. Like many Indian tribes the main source of income was public spending through the colonial administration. They also wanted greater control over their economy so that they would be able to make the basic decisions which affect them rather than the decisions being made in London or a bank in New York. They also wanted to equalize the pace of development so that the benefits of development would go to the entire nation rather than a few outsiders or a small group of people.

Developing a Mining Policy

The next step was to translate those broad economic goals into a mining policy. Mining policy was molded by looking at the nation's major objectives in economic development and formulating into an overall policy to meet those objectives.

The two major objectives were:

(1) Achieving an adequate financial economic return from development to assure that the nation's economic goals would be met.

(2) Control over the development of the resources in order that the nation could have some voice in the way the project is developed.

Mining policy objectives depend on the specific situation of the tribe or nations involved.

Other major consideration are:

a. Jobs: An important goal in areas of high unemployment. It must be remembered that mining is an extremely capital intensive industry and generally provides very little in terms of employment.

b. Training: Mines can provide people with skills that could be used in the development of other enterprises; in some cases training could result in the eventual take over of certain areas of management formerly held by outsiders.

c. Environmental Protection: The disposal of tailings, strip-mining, air and water pollution must be considered. If these goals are particularly important then, a special effort should be made to place the objective of environmental protection high one one's list of priorities.

d. Land Use: Mining can have conflicting effects on other economic sectors such as agriculture or timber. Negative affects can include:

   1. Loss of land for agricultural use.

   2. Diversion of labor from agriculture to mining.

   3. Damage to crops or timber stands from pollution. If one is operating a very sensitive form of agriculture such as wild rice you may find the two operations incompatible.

e. Water: Mines will use large volumes of water which may be a major problem in arid areas. Objectives could be set to demand the recycling of water (as the Papago tribe has done) or to charge the company for water to insure that they use it carefully.

f. Protection of Traditional Patterns of Life: In Papua New Guinea the government has taken precautions to insure that the mining sector interacts minimally with the rest of society.

g. Linkages: The government could require that all or some of the goods and equipment needed for the mining project be purchased from enterprises which are tribally or Indian owned. This may be desirable if the government is attempting to find a base for the development of commercial enterprises. Sales to mining projects could provide an intitial capital base for enterprises which could later diversify their sales to other buyers. Precaution should be taken to insure that such enterprises could feasibly sell to other buyers and also continue to operate after the mine closes. If you don't you may find the tribe's economy dependent solely on the mine.

Another kind of linkage could be the processing of the mineral itself on the reservation so you can profit from the added value created from further processing.

One must realize that in most cases the purchase of goods and services from tribal enterprises could increase the operating costs of the project. It is likely that such enterprises would be of a smaller scale than existing ones and the price of the goods would have to be higher due to the higher production costs of smaller scale enterprises.

In achieving these objectives one must realize that there are trade-offs involved. If money is the overriding consideration for your tribe, put that at the top of the list and then concentrate on selling the resource for the absolute highest price. If there are other objectives that are important, you may find that you have to sacrifice a little money to get them. Training and employment may cost the operation more money thus reducing your financial take. If environmental protection is particularly important, it may also increase the mining costs and reduce the financial take.

Isolating mining operations to prevent interference in tribal life may mean, as in the case of the Papagos, that tribal members are effectively precluded from employment because of lack of transportation or living accomodations. These are hard questions. The choices will affect your tribe in perpetuity.

Negotiating: Turning Your Goals Into Concrete Points

Once general objectives have been determined, the next step is translating those into negotiating points.

In negotiating a mineral agreement it is important to keep the initiative as much as you can. Critically important is to control the draft of the agreement. There is a lot that can be put in when you do the drafting. There is a lot that can be left out if the company does the drafting. Doing the drafting yourself gives you the ability to raise the right issues which you see as important. Otherwise you are constantly fighting a defensive battle trying to poke holes in something rather than promote positively your own point of view. Be the initiator; not the reactor. Today, companies typically come into Indian country distributing lease forms. Even when these are rejected, the company intends to keep the initiative of coming back with new proposals. When this happens, you are in a position to stop and say no, and then offer your own proposals.

Another advantage is to have the negotiations take place at the reservation rather than in a company office a thousand miles away. More people in the tribe will be aware of what's going on and you will also have the psychological advantage of being on your own turf.

In a lot of negotiations, companies come in with piles of computer data showing how the project is barely marginal and will not make much of a profit. There is not a lot of value in looking at the bottom line of these proposals because every negotiater in the business has found companies claiming that the projects are marginal. Of twenty or thirty countries around the world, all of the proposals submitted by companies are for marginal projects. In Papua, New Guinea, when Rio Tinto Zinc first presented its proposal for the Bouganville mine to the colonial government in 1967, they used as a model a mine they were then developing in South Africa and said, "Well, we don't know exactly what you have in the ground but it will probably look like this and that's a pretty marginal project." However, when they signed the contract, they suddenly changed all those figures. What turned out was that Papua New Guinea has a mine three and a half times as big as the one the company showed as an example; that the cost of production is half as much as they said. And surprise, the project is making $100,000,000 a year in profits.

The data the companies produce is useful as an education process, but don't even look at the bottom line. Make them work back through all their costs back to the bottom line. Critically examine how all of their costs are arrived at. What are they listing for smelting and refining charges? How rapidly are they depreciating their equipment?

The availability and accuracy of this data is dependent upon how much exploration has already taken place. The usefulness of the data to you depends on when you start the negotiating process.

Many companies will say that they will not do any exploration until you sign an agreement guaranteeing all financial terms ahead of time. That kind of demand should be totally unacceptable. The company is in effect requiring you to sell an unknown quantity and quality of a mineral at a set price.

An alternative is to get your own data. Put pressure on the United States Geological Service and the Bureau of Indian Affairs. Let them do a little work for the tribe as well as for Saudi Arabia. In some cases it may even be sensible to pay to do it yourself. It may be very difficult to justify spending the tribes' money when you don't know anything about the area and the odds are one into twenty-five that you have an orebody. It may make sense, however, if you are fairly sure you have an orebody and when a little investment in additional data may make a big difference in your bargaining position.

Another altervative in exploration is allow the companies to obtain a permit to explore, but don't make a committment beyond that. If they want to spend money they can go ahead and explore. As to the argument that they won't spend any money unless they have the entire agreement tied up, they have done it all over the world. The two most extreme cases are Kennecott Copper in Papua, New Guinea and Canadian Javelin in Panama. Kennecott spent $17,000,000 in Papua New Guinea with no assurance that they would get anything. Papua New Guinea was unable to come to an agreement with them and Kennecott walked out. In Panama, Canadian Javelin spent $24,000,000 and ended up walking out.

Under any exploration arrangement arrangement, an exploration permit should require that the company provide the tribes with quarterly reports on what they have done; reports on every hole that they drill, copies of all geochemical, geomagnetic and all scientific work. When they start drilling the actual drill cores should be held so tribes may have their own chemists analyze them. A special effort should be taken to analyze as much of their finding as possible yourself. The experience of most negotiators indicates you can't always believe the company supplied data.

Another option is to set very general financial terms with the company but also require that before production begins you can analyze their data and findings and then reopen financial negotiations at that point. If the tribe or nation cannot come to an agreement with the company then production will not occur and negotiations will be done under arbitration with a previously established third party.

In the case of Papua, New Guinea, the government has entered into negotiations over general points are upon agreements the company is allowed to explore.

If an orebody is discovered then the company would be required to issue a feasability study where a number of areas of concerns would be spelled out.

The issues covered would be the physical aspects of the mine; how large will it be, how will it be mined, open pit or underground, the depth of the mine etc. Other issues such as alternatives, methods, and costs of environmental control, the labor force requirements of the mine, the education and training which will be provided to fill those jobs, the housing needs resulting from the influx of laborers and alternative methods of transporting the minerals are outlined in the feasibility study. Often the results of this study are checked by independent agencies to insure accuracy. Environmental impacts may be an area which you want your own experts to look into.

Upon the completion of the feasibility study, the company submits a Development Proposal or a Notice of Final Development, outlining details of exploration findings, projected costs of mining, details of construction and operation and all financial matters.

Included would be:

a) Development and operation procedures

b) Treatment and handling of the mineral

c) Transportation of the mineral and operating supplies needed

d) Power, fuel, water, and supplies

> Together with reasonable evidence of marketing arrangements demonstrating the parties' ability to sell or use the ore or mineral to be produced. This prospect evulation shall also include a program and capital budget which shall encompass.
>
> 1) An itemized budget of capital expenditure
>
> 2) An itemized forecast specifying operating costs
>
> 3) Itemized estimated cash requirements and expenditures
>
> 4) Details of any construction program and
>
> 5) Itemized estimates of production of minerals."

At this point your own experts can analyze the costs of development and work through to the bottom line to determine what kind of profits can be made from the projects.

After you do that, you have the opportunity to reopen financial negotiations. The questions then becomes how much each party should get and how you structure the financial arrangement.

One way to do this is to ask for a certain percentage of the sales revenue or profits and allow the rest to go to the company. A better way of doing it would be to determine what everyone else should get and then provide that you get the rest.

This amounts to analyzing what the costs of production will be for the mining project and what a fair rate of return to the company would be: an analysis of the profitability of the mine.

One way of doing this is to look at the total amount of money that will be invested in the mine and estimating how much **money** will be returned over the life of the mine. The method of analysis is known as the accounting rate of return. Included in this estimate would be:

a. the initial costs of constructing the mine

b. the quantity of minerals which could be produced each year from the mine.

c. the price of the mineral for each year the mine is operating

d. the costs of operating the mine.

Table 1 is a projection of the costs and revenues from a hypothetical mine. The first 5 years are spent in exploration before any orebody is found. In year 6 an orebody is discovered and several years are spent constructing a mine. By year 9 the mine is in production but due to the initial exploration and construction costs that were incurred before there was any revenue it will take 5 more years before the mining venture starts to turn a profit. Then over a period of years the venture will continue to make money. If you analyze the total mining expenditure and the total return over the 20 year period you will find that the company spent 250 million dollars to bring the mine into production and it brought a return of 720 million dollars. That amounts to a 188% return on the investment. A quick look would say that this would be a very good project. However that is not the way a mining company analyzes a project.

The accounting rate of return doesn't account for the long period of mine exploration, evaluation and construction during which the investor receives no return on his investment. The method of analyzing mine profitability that is most widely used today is known as the Discounted Rate of Cash Flow.

Discounted Cash Flow takes into consideration the fact that if one invests funds into a mining project it will take several years before any of that money is returned. During those years the funds invested could have been invested in some other project which would have yielded a certain rate of return. By investing in the mine the opportunity of earning money from some other investment is lost. Investors demand that the rate of return which is lost should be treated as costs. These opportunity costs are arrived at by defining the standard rate of return the investor could have received if those funds were invested in some other project.

For example, in Figure 1, 10 million dollars are invested in exploration during the first year in which there is no return on that investment. If that money had been invested in some other project which could have yielded a rate of return of 17%, those funds would now be worth 11.7 million dollars (10,000,000 x 17).

Table 1

Cash flow for hypothetical mine project

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Exploration Costs	10	10	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Costs	-	-	-	-	-	50	75	75	-	-	-	-	-	-	-	-	-	-	-	-
Operating Costs	-	-	-	-	-	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10
Production Value (Price x quanitity)	-	-	-	-	-	-	-	-	60	60	60	60	60	60	60	60	60	60	60	60
Surplus +/ deficit -	-10	-20	-30	-40	-50	-100	-175	-250	-200	-150	-100	-50	0	+50	+100	+150	+200	+250	+300	+350

For each year in which there is an outflow of funds, the cost of mining is computed by adding the total amount of money spent in exploration or construction and then adding to that the amount of money that was lost by not investing in some other project.

Using the DCF analysis the company calculates an acceptable return only for a 20-25 year period. They do not take into account any cash flow after that period. Under the Standard Indian Lease Form, leases are allowed to go on indefinitely. What that in fact does is give away something which the company is not itself bargaining for. It does not increase the attractiveness of the project.

As you have now determined what you should be able to get from mining development you then must decide what form of agreement will best meet that goal. Structuring agreements is outlined in section 7 of this report.

More on Service Contracts

One way in which service contracts are structured is for the mining company involved to invest no equity or very little equity in the project. The company receives its profits from a series of fees paid to them by the mineral owner. They may receive 1 or 2% of revenues for managing the construction of the project, 1 or 2% for marketing the minerals and a few percent of profit for managing the project. These accumulated fees added up can give the company a fairly good income. What they may not do is give them incentive to maximize profits for the tribe. What one might find is that in dealing with large integrated companies that there won't be any profits.

They may sell the minerals to an affiliated company at artificially low prices and take their profits somewhere else in the company chain. In purchasing goods for the operation they may buy from an affiliated company at overly inflated prices and push up costs in that way. The end result is the elimination of profits in the tribe's piece of the operation while preserving them for the company elsewhere in their business.

Tribes should be aware of those possibilities of manipulation. In order to prevent this, a lot of high powered accounting talents are needed and the tribe will need to develop a complex monitoring system. Service contracts are much more lucrative than royalty arrangements but they are much harder to manage.

Information Sharing

One way of understanding how mineral agreements can be structured and what kinds of objectives and provisions have been outline in agreements is to look at agreements that have alreay been made between companies and developing countries.

The United Nations Institute on Transnational Studies in New York has many of these on hand and the Institute for Development Studies in Sussex, England is interested in providing parties with these kind of agreement. Americans for Indian Opportunity is currently collecting copies of different kinds of agreements, mineral and timber, which will be available on request.

PLANNING FOR DEVELOPMENT

Ann Seidmann, Economist, has acted as an advisor to several African nations in the area of national planning. She currently is Project Director at the Center for Women's Studies at Wellesley College and is a Professor of International Relations and Social Change at Clark University.

In considering the impacts and possible benefits of mineral development it is not only essential to obtain a greater share of the profits produced by the exploitation of your natural resources, but also to use them to attain a balanced, integrated development designed to raise the living standard of all your people.

In this section, the importance of planning will be illustrated by looking at the effects of past mining policies in Zambia; policies which have been the result of colonization and exploitation based on the need of industrialized nations for cheap raw materials. What has happened in Zambia can be called the "development of underdevelopment."

Over the past 50 years the economy of the nation has been transformed from a diversified agricultural economy geared toward supplying its people with basic necessities to an export economy based on producing a single commodity, copper, for the industrialized nations.

The colonization of Zambia has resulted in the development of a dual society: The Traditional Society, where the majority of the population lives and works in an Agrarian Society, where people produce for use and maintain traditional life styles; The Modern Export Enclave, characterized by the production and export of a few raw materials to be processed in the factories of developed industrialized countries, primarily those of the foreign colonial power, England. Most of the more productive resources of the economy - particularly human and physical capital are engaged in the mines and plantations revolving around and dominated by the export enclave.

The traditional areas contribute one important factor to the export enclave: cheap, unskilled migrant labor. The colonialist British government had created a whole series of institutions to coerce Zambians to leave the rural areas and move to the mining areas.

In the days of colonial rule the entire political-economic structure of the colonial government from the administrative departments to the money and banking systems was shaped primarily to facilitate the operation of the mining firms and subordinate the needs of the Zambian people to the needs of the mining firms.

The mines have been very profitable over the last 50 years of operation, however, almost all of the profits have either been siphoned out of the country or concentrated in the hands of narrow high-income groups of Zambians associated with the export enclave activities. The firms who owned the mining operation in the colonial era and who now own a large share of the operation transferred the major share of their profits out of the country - resulting in a significant loss of investable surpluses badly needed by the country. The companies formulated their investment policies primarily in terms of their own interests, rather than in the interest of the nation. The profits which have remained within the country have been distributed to very few people. Less than 10% of the people have received 60% of the remaining income.

The shift of manpower from the agriculture areas to the copper mines has resulted in the deterioration of the traditional agriculture sector and the decay of irrigation systems. The areas once considered the most productive agriculture areas in Africa became the poorest province of Zambia. This decline led to a further exodus of people from the rural areas to the cities and consequent overcrowding and unemployment. The overcrowding is clearly not a result of overpopulation.

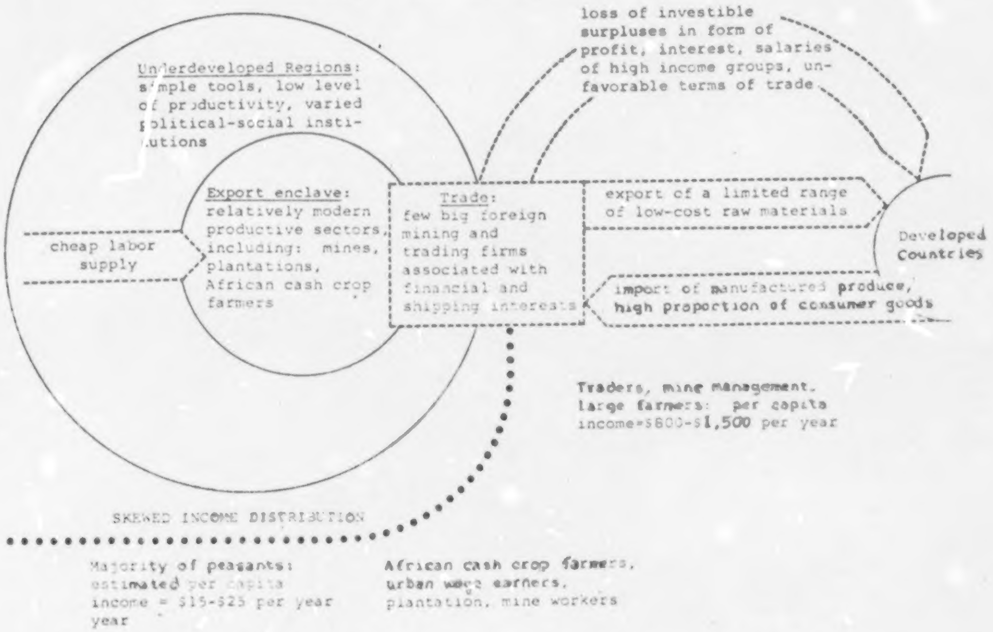
Zambia's economy has then become unbalanced and dependent totally upon the ups and downs of the copper market. The colonial infra-structure promoted their situation to meet their own needs for raw materials.

The situation described earlier is outlined in Figure 1. The underdeveloped regions (traditional-agriculture areas) are abandoned and exploited solely for their cheap labor. The colonial export enclave utilizes the labor to produce commodities for export to developed countries.

The model in Figure 1 can also be used to explain a potential situation on Indian reservations where a large mining venture is operating. The venture could end up utilizing the majority of the tribes labor power and administrative activities, resulting in the abandonment of agriculture and other sectors. Dependence on the fluctuating incomes from non-renewable mineral resources could be the result. In the case of Zambia, independence from Britain did not result in any changes in the basic economic structure outlined in Figure 1 (following page).

FIGURE 1

A Model of the Inherited Dual Economy and Associated Skewed Income Distribution Typical of the Newly Independent African Countries


loss of investible surpluses in form of profit, interest, salaries of high income groups, unfavorable terms of trade
Underdeveloped Regions: simple tools, low level of productivity, varied political-social institutions
Export enclave: relatively modern productive sectors, including: mines, plantations, African cash crop farmers
cheap labor supply
Trade: few big foreign mining and trading firms associated with financial and shipping interests
export of a limited range of low-cost raw materials
Developed Countries
import of manufactured produce, high proportion of consumer goods
Traders, mine management, large farmers: per capita income=$800-$1,500 per year
SKEWED INCOME DISTRIBUTION
Majority of peasants: estimated per capita income = $15-$25 per year year
African cash crop farmers, urban wage earners, plantation, mine workers

Note: This model does not represent geographic areas, but rather suggests the characteristics of the two dominant sectors and the nature of the interactions between them.

The only noticeable change was that black faces replaced white faces at top levels of management. The middle levels of control were still held by foreigners because there were still too few trained Zambians, and the masses of people still remained in low paying, unskilled jobs centering around the export enclave or in the deteriorating traditional agricultural sector.

The government policy for economic development was oriented towards two major changes:

First, by attracting foreign investors it attempted to develop internal industries to produce the good which were normally imported. These industries would stimulate the economy and keep the money that normally flowed out of the country to purchase goods within the country.

It would also provide jobs for the unemployed in the cities.

The import-substitution industries did not in fact change the colonial situation. The lack of planning which accompanied this policy actually contributed to the unbalanced and dual economy. This was largely because:

1. Import goods have generally been luxury goods which can only be purchased by the high income groups.

2. These industries and the goods produced were technologically complex and thus dependent on overseas sources of supplies.

3. The industries were capital intensive, since the foreign firms simply transferred to Zambia the techniques derived in their home countries.

4. The plants were concentrated in urban areas to take advantage of existing markets and external economics, thus further aggravating the lopsided division between the traditional rural areas and the export enclave.

5. Profits still flowed out to the country since these industries were financed or owned by foreigners.

The emphasis on import-substitution industries resulted in the waste of scarce investment funds which could have been better used to produce simple tools and equipment to produce necessities in the rural areas.

Secondly, the government of Zambia decided that they also wanted to gain control over the basic industries, particularly the mining industries. In 1969, the government took over 51% of the ownership of the two big mining companies, Anglo-American (A South African Company) and the Rio Tinto Zinc - AMAX (U. S. Company) joint venture, in an effort to increase its control over the mines operations as well as to promote increased production.

Zambia changed the basis of taxation for the mining companies from a royalty charged upon the value of the mineral produced, despite the profitablility of the mine and an export tax to a mineral tax of 51% of profit and a company income tax on the rest of the profits. The 51% of profits was acquired by Zambia purchasing 51% of the shares in the company. The shares were to be paid out of

Zambia's share of the mining profits. In addition the government instituted a 45% tax of the company's share of the profits.

Since the mining projects were now majority owned by the government, new companies were created to manage its venture. What was created was a parastatal structure, a structure which is partly state and partly privately owned. Each of these parastatal industries was headed by a Zambian, who was highly paid, but whose training was usually either as a teacher or a civil servant, and who lacked the experience in management and decision-making. The lack of experience on their part resulted in the mining company actually continuing to run the day-to-day operations since it was their people whom the parastatal minister had to depend on for advice.

Partly as a result of their lack of experience and partly as a result of the structure of the joint venture arrangement, the mining companies were able to manipulate the mining ventures profits thus reducing the amount that would get to the state through their 51% ownership and 45% tax. The mining company would then pick up their profits somewhere else in their operations.

The first device the companies used was to manipulate the government's investment tax write-offs. The government had offered mining companies a write-off of 100% on every dollar invested in mining production. The intent of this policy was to give the mining companies the incentive to invest their profits back into the mining venture so the profits would not immediately go out of the country. Although in the short run this policy would only lead to reduced government income from taxation, in the long-run it would pay off from a larger more profitable mining venture.

Mining companies did go ahead and invest in increased copper production but they did not invest money they earned from the venture. Instead they borrowed money overseas from big banking companies and invested that money. They continued to send all their profits out of the country. The interest and the loans from the borrowed money then had to be paid for by the joint mining company, meaning that the government not only lost tax revenue, but now has to participate in paying back the loans.

A second problem that occurred was that the government's emphasis on increasing investment in the mines meant that there would be less money available for investment in other sectors of the economy. The possibilities of developing other industries and agriculture throughout the countryside to reduce unemployment was foregone and the possibility of restructuring the economy from a single commodity export enclave to a more diversified economy was lost. When the world copper price fell, a one-third drop in government revenue occurred and there was a cutback in all programs. Investments in other areas became impossible.

A third problem that emerged was the development of what is known as a bureaucratic bourgeoise. Those Zambians who were able to move into positions of power within the parastatal companies and in the government used their positions to get control of a significant portion of the profits from mining. Arguing that Zambian bureaucrats and managers should receive the same salaries as the whites who had those jobs before them, these people received salaries which were 50 times those of the people who were the wage-earners. These Zambians then used their excess salaries to purchase the old estates once lived in by the foreign managers. They soon began to become part of the status quo and to develop the same kind of mentality as those who ran the copper companies under the colonial era.

Often the reason why these particular Zambians achieved their positions was that they were picked out by the colonial government and companies as people who could serve their interest and they were educated to assume the role of colonial administrators. At the time of independence these people were the few who had any education or training. A large share of the surpluses from copper mining were siphoned off to pay the salaries of these people. They used their positions in control of state machinery to advance their own status at the expense of efforts to restructure the economy.

When the copper prices fell drastically, reducing state revenues, these people were not the ones affected although it was they who made the policies which created the problem. The Zambian bureaucrats responded with a policy to cut back production 10%, resulting in the lay-off of a large number of miners. They also cut back on food subsidies for the people in the cities and raised the prices for essential goods.

As one can see, the strategy of getting money from the mines and getting control over the mines themselves was inadequate in the case of Zambia. It failed to take into consideration a need to restructure the entire economy and increase productive employment opportunities throughout the country in order to raise the living standards and quality of life of the mass of the population.

The experience of the Zambian government has led many national planners to search for a new approach to national planning. More consideration is being given to the general process of overall planning and has led to the development of several new aspects of planning.

Considerations should be given to five essential aspects of national planning.

1. Control over the "Commanding Heights". President Nyere of Tanzania has used the term to describe the basic industries and financial institutions which control the economy of a nation.

These would be the industries who exploit the nation's basic natural resources, operate the businesses which provide the nation with goods and operate the banks and lending institutions which provide the capital to develop and operate these industries. Control over these institutions is necessary if any changes are going to be made in the basic economic structure.

In the past these institutions have been operated by outside interests who have directed them for the purpose of getting cheap raw material and markets for their own goods. Unless there is some control over these institutions these colonial conditions will continue. The goal of controlling the "commanding heights" is to insure that the income from one's natural and human resources is kept within the country to be used for internal development. In addition, control will insure that the basic economic decisions which affect the people of a nation are made by people in the nation rather than outside.

Simply taking over a majority ownership of the basic economic sectors does not in itself resolve the problem associated with underdeveloped export economics. As one can see in the case of Zambia, increased governmental control over these industries may result in some government ministers and civil servants utilizing their position to advance their own interest.

What control could create is the pre-conditions necessary for political leaders and planners desiring to plan for the needs of the people; to begin to take appropriate steps to reallocate resources to increase productivity and raise the standard of living of the people throughout the nations.

2. The Necessity of a Long-Term Development Strategy. Once a government has taken greater control over the "commanding heights", it must immediately begin to formulate a long-term development strategy. Planning must be done with intent of coordinating all production and economic activities so that over a 20-25 year period the economy has become balanced and integrated. The goal is self-reliance; meaning that decisions as to the pattern and pace of growth will no longer be dependent either on the fortunes of a few raw material exports in an uncertain world market or the decisions of a few multinational corporations.

The actual physical development plans (construction of mines, agricultural planting, timber harvesting) should be detailed a long time ahead so that these projects end up complementing each other and are shaped by the known economic needs of the people.

Specific areas of attention for planning physical projects include:

a. Linkages: Mining development can be of greater benefit to the community if one is able to link the mining sector directly to other kinds of industries. For example, inputs such as tools, electric power and explosives can be manufactured on the reservation. At the same time, the value of the mineral could be increased by refining it and producing finished products on the reservation. These linkages could stimulate a multiplier effect, setting off chains of growth throughout the community.

b. Technological Appropriateness of the Projects: If the projects are extremely technically complex one would end up dependent upon outsiders for parts and expertise. One should plan to use the technology which is most appropriate to the needs of the people.

In Tanzania they had the opportunity of putting up two different kinds of textile factories. One was French built, which would have used sophisticated mechanical parts and would have cost three million shillings. The other one was

Chinese built, one which would have used simple wooden parts, would have cost one-third as much, and employed three times as many people. The French one broke down and they had to go back to France for parts while the other one could easily be repaired and operated by the people and thus continued to work. The French model may have been productive in France but it was inappropriate for the situation in Tanzania.

c. The Quality of Life Resulting from the Projects: The planning goals should not be merely the creating of profits, but rather directed towards improving the quality of life as directly as possible. This means the creating of productive jobs which result in better income and higher esteem for all the people. The Ak-Chin Tribe in Arizona, which operates a very successful farm, has operated the farm so that they have attained 100% employment. Instead of paying people individually from the profit they have tried to upgrade their living. Modern homes have been built, funds have been invested in grocery, hardware and lumber stores, and a service station so that the dollar turns over many times. All of this has been done by seeking to improve the quality of life and orienting the economy to achieve that goal.

Labor intensive industries may be preferred to capital intensive ones in deciding the kind of projects to develop. The kind of jobs that are created is also important.

Some projects such as tourist facilities result only in menial service jobs. The cultural appropriateness of jobs is also a concern. You may find that many kinds of work are more suited to the interest of the people.

3. Financial Planning. In addition to incorporating the detailed physical features of proposed major projects, spell out how the necessary financing for each project can be obtained.

There are two kinds of financing which can be looked to for capital: Internal Financing, which uses the surpluses generated from internally owned projects to invest in other economic sectors. Income earned from mining projects could best be used as capital to develop other renewable industries so that the nation does not become dependent upon a single non-renewable commodity for income. The result would be a more stable and diversified economy.

External Financing would provide capital to supplement internal financing in developing other industries. The important goal in obtaining external financing is flexibility. Too many federal programs are designed to force tribes into developing projects which fit the plans of federal bureaucrats rather than the tribes. Going after this kind of money often results in the development of projects which lead to no long-term growth and to disinterest of the people. An alternative for external financing could be the organization of a cooperative development bank by Indian tribes.

4. Decentralized Planning. The planning needs to be arranged so that it involves the entire community rather than a few bureaucrats who had no real self-interest in the result of their actions other than defending the interest of the colonizer. As one can see from the case of Zambia, unless this structure is completely changed it will continue to function in that way.

The development of new institutions is needed to foster two way communication between the people and the political leaders and planners to insure that efforts represent the goals of the people.

There is a tendency for governments to allow the decision-making and planning to be done by experts who have considerable knowledge of the area in question. There is a danger here of the experts usurping the people's right to decide on an issue just because they have the expertise. It is important to draw in experts to help clarify the alternatives in decision-making but ultimately, if the decision is going to benefit the people, they must make the decision. To make informed decisions the people must be completely informed in all aspects of the issue at hand. That makes it very hard to keep information confidential. For that reason many governments have operated in secrecy. In the case of considering mining policies, nations have made it a major point to keep all information in the hands of experts and a few government officials for fear that distributed information would give the companies they are dealing with an "edge" in negotiations. The result is that the people were excluded from the decision-making process. In those cases it also has turned out that the decisions made did not reflect the interest of the majority of the people.

Generally, the need for confidentiality is exaggerated. Mining companies have much more information and expertise in the areas of concern than the government. Information that could leak out would not be anything new. The only result would be that the people would be excluded from the decision-making.

Regardless of whether the experts are outsiders or Indian experts, the self-interest of all the people can only be implemented if all of the people make the decision.

When faced with the issue of mineral development in Indian lands, decision-makers must not only be concerned with getting control over the operations and assuring that the surpluses created are retained by the tribe, but also insure that the surpluses created are reinvested in other sectors of the economy which can improve the quality of life. Special concern should be taken to insure that the people can benefit from, and be involved in, the entire planning and decision-making process involved in developing a mining sector.

TRIBAL POWERS AND TAXATION

Don Wharton, Esquire, has spent the past two years researching questions of Indian law for the American Indian Policy Review Commission. He is currently on the staff of the Department of Interior Solicitor's Office.

Tribal Powers and Taxation

Indian tribes possess certain inherent powers of self-government which is based on the sovereign status tribes have held since the beginning of their existence. Upon the arrival and settlement of Europeans tribal sovereignty has sometimes been limited by treaties and law but their sovereignty has never been extinguished. All of the tribes' sovereign powers have been retained except when a specific sovereign power has been limited by a law or treaty.

To determine what sovereign powers have been limited, the statutes of Congress must be examined to determine the limitations rather than to look somewhere for sovereignty that has been given to tribes. What is not expressly limited remains within the domain of tribal sovereignty.

There are four major categories of federal limitations on sovereignty:

1. General Federal Statutes: Congress has passed several statutes which apply to all tribes. Examples are: The Non-Intercourse Act, an act which prohibits the sale of trust land for tribes, and The Major Crimes Act, which outlines several crimes which are under the jurisdiction of the federal government. There are other general statute limitations.

2. Specific Federal Statutes have been enacted which limit the powers of specific tribes; for example, The Curtis Act of 1898, which abolished the court system of the Five Civilized Tribes and rendered their law unenforceable in federal courts.

3. The Indian Civil Rights Act: Prior to this act the Supreme Court had enunciated the legal principle that constitutional protection applicable to federal and state government could not be imposed on Indian tribes. The act specified that tribal governments adhere to certain standards of conduct which are very similar to those outlined in the Bill of Rights.

4. Tribal Constitutional Limitations: The tribe's own constitution may limit the exercise of a tribe's power of self-government. If the constitution does not specifically provide the council with a power, it may be construed to mean that they have no such power.

The Exercise of Tribal Powers

In reaching a determination as to what tribal power can be exercised, the first step is to see if there are any limitations on the power under consideration. If none can be found it may be assumed that you have it. Generally you will find that most of the issues have not been defined. Most have not been decided by the courts and only a few have been decided by the Supreme Court. One thing is clear and that is there is no way to know the extent of tribal power until it is exercised. If you don't exercise power you could lose it by default.

Taxation

As governments, tribes have and must exercise the power to raise revenues and support their activities. As a practical matter, without revenues tribal governments could never survive as independent entities and would have to exist without self-determination.

In the past, state and federal governments have levied taxes on enterprises on Indian lands while tribal governments have not. Consequently, state and local governments often profit more from reservation development than tribes have.

The power of a tribe to tax persons and property within reservation boundaries has been confirmed repeatedly. There have been no court decisions limiting the tribe's power to tax. For example: In the case Morris v. Hitchcock, the Supreme Court upheld the validity of a tax imposed by the Chickasaw Nation levied upon all cattle grazed on the reservation (non-Indian owned).

In the case of minerals, the Secretary of Interior approved a tax code instituted by the Crow Tribe. The tax would be a severance tax of 25% of the value of each ton of coal mined. The Crow tax is particularly important because it amounts to the tribe assuming jurisdiction over non-Indians on the reservation. If the tribe's right to tax is to be upheld, tribes must act now by instituting and enforcing a tax code. The possibility exists that if tribes do not act now, the power to tax could be lost.

Tribal taxations may be difficult or impossible if state taxations of the enterprises on Indian lands is allowed. The heavy financial burden of both governmental entities taxing could be severe enough to prohibit certain kinds of economic development and consequently could threaten the existence of Indian government and culture. The extent to which state taxation will remain valid is most dependent on the actions of tribes in asserting their own taxation authority and enforcing it.

There are several theories which have been used to invalidate state taxation:

1. Federal Instrumentality Theory: the argument here is that the tax exemption granted to Indian enterprises on the reservation should be transferred to non-Indians who lease Indian land. Such a transfer would be of benefit since it would allow the tribe to charge higher rates on the lease and ultimately would serve the same purpose as the tax exemption for Indian people. The argument has not fared well in recent court decisions.

2. Non-Interference Theory: a longstanding doctrine which has been repeatedly reaffirmed by the Supreme Court has been that states have no jurisdiction over reservation activities or property where the jurisdiction would interfere "with the right of reservation Indians to make their own laws and be ruled by them" (Williams v. Lee, 358 U.S. 217,220, 1959). Under this theory one can argue that a tribal tax on non-Indian ventures will preempt the state's power to apply another tax if the venture being taxed is integrally related to the tribe's economic developments. The non-interference theory based on the Williams v. Lee Supreme Court case has been somewhat limited in recent years.

3. Double Taxation Theory: if the state taxes mineral production on Indian lands, the extent of the tax may be so profound that it would be nearly impossible for both the mining company and the tribe to profit from the operation. The fact is you have dual and unfair taxation.

States have been successful in several instances in instituting severance and property taxes on minerals production from Indian lands. It is not completely clear whether or not a tribe can preempt these taxes with their own tax when the mining venture involves a leasehold interest. That is, the land and minerals have been leased to a non-Indian operation.

Most of the taxing power of the state is tied to a lease-hold interest. That indicates that the best direction for tribes to go would be away from any form of leasing and toward joint ventures and other forms of direct ownership.

In the case of joint ventures, the issues of state taxations has not been decided by the Supreme Court. It appears that joint ventures can be exempt from state taxation as long as tribes can tie these ventures very specifically to their self government interest.

The more quickly tribes act to institute tax codes and set up systems for auditing and collecting taxes and for penalizing tax evaders the more likely it will be that the tribe's taxing powers will be preserved.

Liability and Tribal Ownership of Mining Ventures

In the case where a tribe is a joint venture partner or complete owner of a mining project it is often feared that the tribe would be liable for any disaster that could occur or for funds lost if the project fails. First of all, tribes have sovereign immunity from any law suit that could be brought against them. They would not be liable. It is argued that this would make it difficult for a tribe to raise money for a mining venture if a bank or lending agency realized that they couldn't get their money back if something went wrong. However, the argument of liability is really irrelevant since money raised for the venture would not be raised by the tribe but rather by the company. Mining companies would have no problem due to their long record of reliability and due to the fact they are closely interconnected with the banks and lending agencies who provide the capital.

Secondly, tribes don't have to put any money into a joint venture arrangement since they are already putting up the resources. There is no need for investing capital if you own the resources; that's your part of the bargain.

Joint venture and other agreement forms in which a tribe or government is an owner generally have provisions which insure that the government is never in the red on its interest. The Papua New Guinea-Exxon Petroleum Agreement stipulates that if the operation goes in the red the company has to come back in and pick up the operations until it is operating profitably. The Navajo-Exxon Joint Venture Agreement has a provision specifically releasing the tribe from liability.

CONCLUSION

Many participants felt that a possible next step could be the establishment of an inter-tribal cooperative similar to the now existing Council of Energy Resource Tribes (CERT). The problems and issues involved in non-fuel mineral development being different than energy resources could be better approached by non-fuel tribes co-ordinating many of their activities related to mineral development. A non-fuel mineral cooperative could provide several services to members.

1. Research: Common concerns such as forms of agreements, finance, prices, marketing, and linkages could be researched and findings disseminated to each member so that each tribe could have necessary information to make informed decisions. Environmental impacts and protective measures could also be examined looking specifically at effects on Indian tribes. Research coordinated by such a cooperative would have the advantage of being directed towards the specific needs of tribes rather than other entities.

2. Expertise: A cooperative could employ or contract experts in areas where expertise is needed: negotiators, mining engineers, mining economists, geologists and lawyers etc. The expertise could be more directly accountable since they may be able to be employed on a full-time basis rather than a temporary basis. Tribes who can't afford the expertise would be able to have it by sharing the expenses with other tribes.

3. Information sharing: Tribes could share their own experiences in dealing with companies and controlling impacts of development mining agreements entered into by tribes could be shared so that each tribe could have an idea of what kind of agreements are being made. The cooperative also could act to share information and agreements with international non-fuel mineral organization.

The advantages of a non-fuel mineral tribe cooperative would be

a. It would be independent from the goals and regulations of federal agencies who are not directly accountable to tribes.

b. It could provide services to individual tribes which each may not be able to afford on their own.

c. Each tribe could improve their bargaining position with the companies by coordinating their actions with other tribes.

Several participants also suggested that it may be useful to continue these discussions in the future. Possible formats for meetings included; meeting with representatives of developing nations to discuss common problems and strategies shared by those nations and Indian tribes.

Another useful format could be meeting with representatives of major mining compaines so that decision-makers could get a clearer idea of the goals and attitudes of mining companies.

APPENDIX A

ENVIRONMENTAL IMPACTS OF COPPER-NICKEL-ZINC DEVELOPMENT.

This report explains the process of exploration and development of a copper-nickel-zinc mine. It deals with the by-products of such mining development and the effects of this pollution on the land base and air and water quality. Additionally, it explains the concept and importance of monitoring water quality. This report is based on a study prepared by the Minnesota Public Interest Research Group entitled "Water and Copper-Nickel copies of the complete study can be obtained by writing:

MPIRG
3036 University Ave. S.E.
Minneapolis, Minnesota 55414

THE COPPER-NICKEL MINING PROCESS

Introduction

Throughout the history of copper and nickel mining, environmental destruction has been closely associated with the extraction and refinement of such ores. Pollution of the land, air and water has occurred. Water pollution has been a particularly cumbersome problem. Large volumes of water are required for processing and concentrating ore. Runoff and seepage from sailings ponds, dumps or stockpile areas are often heavily contaminated with pollutants.

Copper-nickel ore deposits often contain a large number of highly toxic chemicals. Many of these chemicals, including copper itself, are poisonous to fish and other aquatic life. Interconnected waterways contaminated by the normal flow of water can carry these pollutants great distances. For this reason even the slightest copper-nickel water runoff or airborne dust can have a lethal effect on water quality.

Protection of the water system can only be assured by water quality monitoring. Indian tribes with assistance from the federal government together with mining companies, must embark without further delay on planned, full-scale, long-term monitoring of water quality.

The responsibility we hold as human beings, stewards of this earth, demands nothing less than our full attention to these problems. Should the dangers of mining be so great as to imperil our streams, lakes and drinking waters, then this data will help us to make the decision not to exploit our copper-nickel ores at the present time but to wait until proper technology is available to prevent such adverse effects.

The Mining Process

Copper-nickel orebody exploration is done initially by airplanes using magnetic sensors to pinpoint general locations with test holes drilled to define the precise locations. Finally, a test shaft will be sunk or an open-pit dug if the ore is near the surface. Analyzed bulk ore samples determine the feasibility of production. These steps all require water appropriations and further mining production requires excessive water availability.

The mining process also requires facilities such as roads, buildings, railroads, power plants, and transmission lines in addition to areas for stockpiling, wasterock, concentrate, slag, etc. Development periods can last several years and have impacts such as large scale construction projects. The influx of such mining and construction workers, machinery, etc. brings social and cultural upheaval to any developing area.

The production process in both open-pit or underground mining create large amounts of storable wastes. These wastes, extracted through physical and chemical processes, are deposited in a tailings pond. Here again, large amounts of water are utilized. Smelting, to produce copper-nickel purity, or further furnace refining virtually remove all remaining impurities and the metal is then ready to use.

Sources of Pollution

The by-products or pollution sources of the mining process include:

erosion,
sedimentation,
gas and dust emissions,
water discharges,
and leaching.

Occuring in all stages as a result of vegitation's inability to root on waste surfaces, erosion can cause drainage changes and sedimentation deposits which adversely affect water and deplete valuable land surfaces for many miles.

Winds carrying dusts produced in mine drilling and blasting operations have toxic effects on land, water and air where they travel and settle. Also gases (sulfer-dioxide and nitrogen oxide) from smelters or power plants can penetrate a watershed along with ash and heavy metal particles and produce highly adverse effects.

Water discharges from mine, surface, and processing waters used in mining contain chemicals and other pollutants which produce environmental impacts which will continue to affect the area for years. Mine waters seep into underground water supplies and carry toxic materials which filter into public drinking waters. Highly acidic surface waters can pollute by precipitation runoff or inadequately treated discharges. Alkaline process waters with chemical and even metal concentrates are highly contamative.

Further water contaminations occur from sewage, smelting scrubbers, or accidental spillage.

Leaching and seepage occurs throughout and beyond termination of any mining operation. Leaching occurs when waters percolate through tailing basins, waste or ore stock-piles. Seepage occurs through the bottom of the basin directly into underground water supplies. These waters, contaminated as they are and concentrated in lowland basins or swamps can be incredibly dangerous, are extremely toxic and are certainly unfit for consumption.

Soil productivity begins to decline as a result of nutrient loss and a series of impacts begin. Economic losses occur due to reduced range and forest productivity brought about by erosion of the soil nutrient base. Although this may not be totally evident for decades, the direct effects of acid rains, gaseous sulfer dioxide and other pollutants adversely affect forest and rangeland vegetation and pollute surface and groundwater. In some cases on certain soils, there may be a temporary increase in the lushness of vegetative cover as nutrient flux is increased through soil acidification. Ultimately, in a few decades these soils could lose their support abilities through over productivity. Then their ability to support vegetation would decline rapidly and permanently to a very low scrubland level.

As soil productivity declines, nutrients leached from the soil will be added to groundwaters and especially to surface water. This leads to eutrophication* and clogging of surface water drainageways and ponds. Groundwater is particularly susceptible to concentration of leached nitrogen and can be toxic to infants and cattle.

The final result of decreased vegetation is physical erosion. Once the soil is eroded chemically, there is little to hold it in place and it is possible that within 100 years after the beginning

*Eutrophication

> The process in which soils, nutrients, minerals, wastes and other foreign matters collect in a pond or lake, producing increased vegetation, loss of oxygen and as a result chokes out both vegetation and most forms of aquatic life. If the process is not reversed, over a number of years the body of water can become swampy and eventually become a dry hole.

of such pollution, the soil itself may begin to erode severely and the very landscape will be lost. Such changes will likely become most evident initially in forest soils. Since these soils cannot be replaced naturally these major and fundamental impacts are essentially irreversible and permanent and because many Indian reservations base much of their economic stability on the productivity of their forest and farm lands, these matters must be given grave consideration before any mining development is begun.

THE EFFECTS OF COPPER-NICKEL OPERATIONS ON WATER QUALITY

Copper-nickel mining pollutants affect people through drinking waters and through the food chain; by eating contaminated fish. There is no agreed upon permissible standards for emissions or guidelines which regulate this area and, therefore, contaminates do infiltrate both drinking and aquatic waters.

Effects to the aquatic ecosystem include:

(1) Decreased productivity of species and lower capacity to support species life,

(2) Lowered diversity, i.e., number of species present,

(3) Altered biotic succession (evolution process).

The entire stability and balance of the ecosystem can be threatened or permanently altered by any of the above actions.

Many species will migrate from an area or may be simply outrightly eliminated by polluted waters. Additionally, the alteration of vegetation or smaller species in the food chain can alter reproductive success, growth, productivity, biochemical functions and behavior of the fishes.

Pollutants travel by air and water for hundreds of miles and still produce adverse affects. Acidic rainfall from sulfer-dioxide smelting emissions have been devastating. Logically, we can assume that heavy metals on the soils surface also enter the watershed through rainfall or runoff and these can be assimulated in both fish and water vegetation and inturn enter our food chain and endanger public health.

WHY MONITOR WATER QUALITY?

A baseline study is an intense effort to monitor the specific data on a subject (be it air, water, etc.) over a period of two two three years on a continous basis. This type of study, to be valuable to all concerned, must be conducted prior to the operation of any proposed industrial development, during the development and continue after the industrial plant has begun operation.

A baseline study provides a reference point to determine if (in this case) water quality is degraded once copper-nickel operations begin. The studies should include:

> topography, quality and quantity of water flow, flora, fauna, climate, hydrology, sediments, physical-chemical characteristics and the interactions between the former.

Identifying problems of a per-operational basis in this study will protect companies from false acquasations regarding water quality; establishes water availability, provides a basis for judgments in planning the region's future. For this reason, baseline data is essential and the most important fact for an Indian tribe to consider. It will give them concrete facts on their water quality and availability so that they can determine if the proposed mining operation will rob them of water needed to maintain their range or farmland. It also establishes quality of water and gives them legal evidence should it become deteriorated after the operation of the mine is established.

The major reason for operational monitoring is for some source to record mining operations and keep the public and governmental officials informed if the mining companies are complying with the tribe's and federal regulations. The probability that a release of pollutants will take place--either accidential or planned--is very high.

Eventually mining operations take a tool on the land and when surrounding rocks can no longer neutralize acids arising from decomposition of iron sulfides, acid drainage occurs. Because of these acid drainages attempts are being made to build a fool-proof, pollution-free system. The facility planned would be extremely costly, difficult if not impossible to construct, and would need to be dust-free, totally contained and balanced. In cases where total containment cannot be achieved, a continous decant flow will be generated and will simply be a continous source of pollutants.

Despite preparations or predictions, nature often proves unpredictable, especially with spring floods, high precipitation and normal spring runoff.....all of which can overload any facility. People and structures they build are fallible and mistakes can occur especially during peak stress times, thus, another important consideration at this point is the human factor.

Once a mining operation is closed your worries are not over. Time adds greatly to the probability of future pollution in any mining area. Water discharges may have to be sealed or perpetual treatment may be required. If this treatment is not undertaken by the mining company it will need to be done by the tribe and it can place a tremendous financial burden on the concerned parties.

Along with the above known problems, many unknown problems exist and are cited below as areas of needed research:

(1) Toxicity research on the aquatic ecosystem

(2) Sediment Impact

(3) Interaction of Chemical Pollutants

This research will help fill the gaps in now questionable areas which will have great impact on the environment and human health factors. Governmental units, along with mining concerns, should be responsible for the development and financing of such needed research which should be undertaken immediately, and then made available to the public for assesment in making decisions regarding mining development on their properties.

CONCLUSIONS

Water baseline data is of invaluable importance in supplying needed information to examine pollution problems and provide a warning system in circumstances of change. It also provides a legal basis for prosecution if such action becomes necessary. Without the baseline data of several years, any attempt at litigation would be most questionable and probably doomed to certain failure.

Tribes considering copper-nickel mining development need to take a long-hard look at the many pollution effects to their land, water and air along with the contaminants to the health of tribal members. If development of such a mining operation on their reservation would prove to costly to them, then certainly the best alternative is to withhold this particular development until better technology for development (with such adverse affects) is made available.

APPENDIX B

CONTROL OF AIR POLLUTION FROM OFF-RESERVATION INDUSTRIAL DEVELOPMENT.

An analysis of the 1974
Environmental Protection Agency
Regulations regarding significant deterioration of air quality
as it effects Indian Tribes.

In 1974 the Environmental Protection Agency (EPA) issued regulations for the prevention of significant deterioration of air quality. These regulations allow any governing body to protect areas with clean air from the deterioration of their air quality.

These PSD regulations established three different air quality levels within the United States (Classes I, II and III); and regulates two kinds of pollution: sulfer-dioxide (SO_2) and floating dust-like particles called total suspended particulates (TSP). Additionally, there are nineteen categories of polluting sources covered by these regulations; mostly large factories, generating plants and the like, while mining and agricultural operations are not affected.

Specific class definitions:

CLASS I	Applies to areas in which practically any change of air quality would be considered significant;
CLASS II	Applies to areas in which deterioration normally accompanying moderate well-controlled growth could be considered insignificant;
CLASS III	Applies to those areas in which deterioration up to the national standards would be considered insignificant.

EPA classified the whole United States as Class II but allows states, federal land managers and Indian tribes to petition for a classification change for their lands by "redesignation action."

If an Indian tribe decides that it wishes to limit more strictly the additional pollution allowed over its reservation, it may apply for redesignation as a Class I area. Only very small amounts of additional pollution are allowed in a Class I area. On the other hand, if a tribe decides that it wants to allow more additional pollution than the Class II increments permit, perhaps in order to promote industrial development, it may apply for a Class III designation, under which pollution is allowed up to the level of the national standards.

All redesignations, whether by Indian tribes, states or federal land managers, require a lengthy and rather complex procedure. Governing officials must:

(1) Notify EPA of redesignation intentions,

(2) Submit a report outlining the effects of pro-

posed changes on the area, surrounding regions and the nation as a whole.

(3) Letters of explanation are sent to city, county and federal governmental offices along with published news articles in areas which may be affected by the change.

(4) A hearing is then held in the affected area, followed by public response from the initiators, after which a revised report is submitted to EPA for final determination.

The authority given to Indian tribes to redesignate is intended to give them the power to decide what quality of air they will breathe on their lands. Another effect is the ensuring of a range of choices regarding the types of industrial or energy resource development the tribe will undertake since various different types of development have different effects on the air quality. If tribes lose the power to initiate redesignation, this choice will be dependent upon the initiative of the state in which the reservation is located.

The 19 categories of PSD regulations are:

1. Fossil fuel steam electric generating plants of more than 1,000 million BTU per hour heat input.
2. Coal cleaning plants
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters*
6. Iron and steel mills
7. Primary aluminum ore and reduction plants
8. Primary copper smelters*
9. Municipal incinerators capable of charging more than 250 tons of refuse per 24-hour day
10. Sulfuric acid plants
11. Petroleum refineries
12. Lime plants
13. Phosphate rock processing plants
14. By-product coke oven batteries
15. Sulfur recovery plants
16. Carbon black plants (furnace process)
17. Primary lead smelters
18. Fuel conversion plants
19. Ferro-alloy production plants.

(New construction or expansion of the nineteen sources that began after June 1, 1975, are subject to the regulations.)

Primary zinc and copper smelters have a direct adverse effect on vegetation, and also these emissions can convert to acid sulfates and nitrates in the atmosphere. These acids may be scavenged by rain and snow and deposited on plants and soil over very wide areas. This increase in the acidity of precipitation results in the phenomenon called "acid rains." Studies by European and American scientists have adequately shown that acid rains cause a decrease in soil and other forest productivity and have serious impacts on both aquatic and terrestrial ecosystems.

Trees such as ponderosa pine are the most susceptible species to needle damage by acid rains. A primary reason for this is that each cluster of ponderosa pine needles is wrapped in a sheath of tissue. This sheath encloses the base of the needles where the active growth occurs. When acid rain droplets fall they are intercepted by the trees, travel down the needle and lodge around the sheath and, concentrated there, do the most damage to the most vulnerable part of the tree. Plants are most susceptible to acid rain damage when there is young and actively-growing tissue present--namely, in the spring and early summer. It is during this season that approximately 50% of the total annual precipitation occurs in most areas of the country.

First, soil and nutrients are lost directly as a function of change in acid precipitation, secondly, as the nutrient capital decreases, land productivity is lost resulting in economic hardships. As vegetation cover is reduced and soil physical characteristics change, the increased runoff leads to soil erosion and reduced recharge of vital groundwater supplies.

Once soil producitivity is reduced or lost the entire economic balance of an Indian reservation is jeporadized. The replacement of soils cannot be done naturally and the financial burden of artificial replacement of eroded soils would be exorbitant.

To date only one redesignation has been proposed and this application for redesignation as a Class I area is now pending before EPA. The Northern Cheyenne Tribe initiated this request after determining that coal-fired power plants, coal gasification and other industrial plants, located on or within commuting distance of the reservation might greatly degrade the environment, cut productivity of forest and grazing lands and increase the health problems of tribal members.

The construction phases of industrial and generating plants will produce "boom towns" such as Gillette and Rock Springs, Wyoming. The sudden influx of construction workers brings social and cultural chaos even to stable farming communities where there is little cultural difference between newcomers and local community residents. The impact on Indian peoples would be far greater. While farmers and ranchers have many options if they do not like the impacts produced by boom towns, Indians have no options. There is no where else they can go. They must remain on the lands which their ancestors fought so hard to obtain and live among the influx of cross cultures, pollution from cars and machinery, etc.

Class I designation does not mean, of course, that no polluting source can be built near a reservation, but only that the source must be able to show that it will control its emissions enough to avoid contamination of the air in excess of what is allowed. Thus the power that EPA regulations provided represents an important aspect of tribal authority over tribal lands, the course of development there, and the development of nearby areas. This power is now in jeopardy on two fronts, the Supreme Court and the Congress.

The Courts

The EPA regulations have been under legal challenge since they were published. Among the many issues raised were the powers of the Indian tribes and federal land managers to redesignate. Recently, the Court of Appeals for the District of Columbia Circuit upheld the regulations but did not decide whether EPA had autority to give this redesignation power to Indian tribes or federal land managers. The court rules this question was not ripe for decision.

Petition for review were filed in the Supreme Court. That court has to decide the following two questions:

(1) Whether EPA had authority under Clean Air Act to issue any regulations regarding pollution limitations in clean air areas and

(2) Whether EPA had authority to allow Indian tribes and federal land managers to redesignate the lands within their jurisdiction.

The entire regulatory structure will be null and void if the first question is decided against EPA; if that question is decided for EPA, there is the possibility that the second one will not be. If either decision is against EPA, the Indian tribes will lose the power they now have to control their own air resources. In order to defend the authority of Indian tribes in the Supreme Court, rationale based on treaty rights and historic jurisdiction is essential.

The Congress

In the last session of Congress, extensive amendments to the Clean Air Act were passed by both the House and the Senate. The conference bill failed when a filibuster on the last day of the session prevented it from coming to a vote in the Senate.

While both bills contained explicit provisions to prevent significant deterioration of air quality, neither bill mentioned the power of the Indian tribes to redesignate tribal lands. Rather, both bills emphasized the power of the states to control air quality and took most existing authority over clean air from EPA.

If this bill had passed, EPA would have continued to consider the Indian Tribes as having the power of redesignation or the courts would have upheld this continued power until their powers were specifically removed by legislation.

The present session of Congress is again considering Clean Air Act Amendments and it appears likely that provisions adopted will replace the EPA regulations. The major concern in this area is whether the bill will express a provision preserving Indian authority.

Any powers retained by Indian tribes will depend largely on the language of the statute, its legislative history and legal arguments on the inherent, pre-existing authority of Indian Tribes over their own air quality on their lands.

Conclusions

EPA has recognized the importance of the regulation of air quality by Indian Tribes. However, others in governmental offices would remove this power. The important factor for consideration here is the preservation of the power of redesignation explicitly by the Indian Tribe over their own lands. Everything possible must be done to maintain this authority as it was originally recognized.

Copies of the Northern Cheyenne Air Quality Redesignation Report and Request can be obtained by writing:

Northern Cheyenne Research
Project
P. O. Box 388
Lame Deer, Montana 59043